CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

SPECIFICATIONS

FOR

2017 ASPHALT OVERLAY TASK ORDER PACKAGE 5

CITY MANAGER
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12/8/16

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DECEMBER 2016

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Project Description

Project Duration
This task order construction contract shall be terminated three hundred and sixty five (365) calendar days after issuance of the first task order. The construction time (in calendar days) for each individual task order will be negotiated between the City Engineer or Project Manager and the Contractor. The Contractor will be expected to begin construction for each individual site in accordance with Article 1- General Provisions, Section 1.2.4, Notice to Proceed and Commencement of Contract Times in the General Conditions-City of San Antonio Construction Contracts. The Contractor may also be limited to the amount of individual project sites open at any given time. Liquidated damages for construction time will be assessed on a per task order basis should the contractor fail to complete the construction in the specified calendar days as negotiated by the City Engineer or Project Manager.

Project Scope
Project construction may include but is not limited to: asphalt milling and overlay, seal coat, base and pavement replacement, cleaning and sealing joints and cracks, curb ramps, concrete curbs, sidewalks, driveways, concrete retaining walls-combination type, concrete bus pads, speed humps, topsoil, sodding, signage, striping and pavement markings removal and installation, adjusting existing valve boxes and manholes, and any other items required due to the site conditions to accomplish the project scope.

Quantities included in this contract, as well as the entire bid amount are not guaranteed. Unit prices established shall remain valid throughout the duration of the contract.

Project Location
The sites shall be assigned by the City Engineer or Project Manager and shall be located throughout the City. Each project site will be issued as a separate Task Order and quantities will be provided to the Contractor.

It is anticipated that some project sites may require working time restrictions or night and weekend work. No additional compensation will be paid or given to the contractor for reduced working times or night and weekend work.

Important Notes
No direct payment shall be made for the following specification items. Contractor shall include cost of these items in various other bid items:

100.1	Mobilization
100.2	Insurance and Bond
101.1	Preparing Right-of-Way
530.1	Barricades, Signs, and Traffic Handling
540	Temporary Erosion, Sedimentation and Water Pollution Prevention and Control

Excavation due to construction of curb, sidewalk, retaining walls, driveways, and parkway grading (edge of pavement/curb to property line) shall not be paid for directly but shall be included in various other bid items of which it forms a component part.

The City will pay additional mobilization (see Supplemental Specification 7) accordingly for the following situations:

1. For special request projects where the Project Manager requires immediate mobilization (within a 24 to 48-hour period) by the Contractor.
2. For instances where the contractor has mobilized equipment to a specific site, then is asked by the City to relocate equipment to a new project without performing any work on the original project.

Flatwork Construction Method:
See details in the specifications.

Concrete Curb, Curb and Gutter, and Mountable (Roll Over) Curb:
All cost to install this type of curb shall be paid under Item 500.1 Concrete Curb, Curb and Gutter, and Mountable Curb.

Reference Special Provision Item 502 – Concrete Sidewalks for payment of concrete sidewalk and curb ramps.

City of San Antonio Traffic Engineering Department will typically recommend traffic control layout at each project location.

All City of San Antonio Specifications & Construction Detail sheets are available on the City's Website at:
http://www.sanantonio.gov/TCI/CurrentVendorResources/StandardSpecificationsandDetails.aspx

All Construction and Material Specifications for SAWS bid items are available at:
http://www.saws.org/business_center/specs/constspecs/
http://www.saws.org/business_center/specs/matspecs/

The Specific Contract Documents for this project are available on the City's Website at:
http://www.sanantonio.gov/purchasing/biddingcontract/opportunities.aspx
Click on the following link "2017 Asphalt Overlay Task Order Package 5"

CITY OF SAN ANTONIO

Project Name: 2017 Asphalt Overlay Task Order Package 5 **Date Issued: December 9, 2016**
ID NO.: 23-01474-5

The estimated construction budget for this contract is $6,000,000.00

020
BID FORM

_____
Legal Name of Company (print)

I. BASE BID

Total Amount of Base Bid Insert Amount in Words and Numbers):

_____ **$** _____

II. ALLOWANCES :

_____ $ _____

_____ _____
Person Authorized to Sign Bid/Contract (Print) Title of Person Signing

_____ _____
Address Fax No.

☐ Local Headquarters
(*Check one*)
_____ ☐ Local Branch Office
City, State and Zip Code

_____ _____
Telephone No. E-mail Address

Name of the proposed **Project Manager:** _____

Name of the proposed **Site Superintendent:** _____

CITY OF SAN ANTONIO
025 UNIT PRICING FORM

PROJECT NAME: FY 2017 Asphalt Overlay Task Order - Package 5
PROJECT NO. 23-01474-5

ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
			The City only will accept bid pricing to the hundredths. Any pricing extended out to three decimal points will be truncated to two decimal points in the City's favor.					
103.1			REMOVE CONCRETE CURB	LF	3,100			
103.3			REMOVE SIDEWALKS AND DRIVEWAYS	SF	19,400			
203.0			TACK COAT	GAL	4,000			
205.4A			HOT MIX ASPHALTIC PAVEMENT TYPE D (2" THICK) (PG 64-22)	TON	32,600			
205.4B			HOT MIX ASPHALTIC PAVEMENT TYPE D (LEVEL-UP)	TON	1,200			
208.1			SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPH. PVMT (2")	SY	215,000			
230.3A			REPLACING BASE & PVMT WITH TYPE B PVMT (6" COMPACTED DEPTH)	TON	15,500			
230.3B			REPLACING BASE & PVMT WITH TYPE B PVMT (12" COMPACTED DEPTH)	TON	600			
250			SEAL COAT	SY	294,500			
438			CLEANING EXISTING JOINTS	LF	350			
454			HEADER TYPE EXPANSION JOINT SEALANT	LF	350			
500			CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER	LF	3,100			
502.1			CONCRETE SIDEWALKS	SY	1,400			
502.1A			CURB RAMPS	EA	375			
503.1			PORTLAND CEMENT CONCRETE DRIVEWAYS	SY	1,100			
512.1			ADJUSTING EXISTING MANHOLES (STORM SEWER)	EA	30			
512.1B			ADJUSTING EXISTING MANHOLES (AT&T)	EA	15			
515.1			TOPSOIL	CY	650			
516.1			SODDING	SY	2,300			
533-A			ELIM EXIST PVMT MRK AND RAISED MARKERS (4")	LF	450			
533-B			ELIM EXIST PVMT MRK AND RAISED MARKERS (8")	LF	300			
533-C			ELIM EXIST PVMT MRK AND RAISED MARKERS (12")	LF	300			
533-D			ELIM EXIST PVMT MRK AND RAISED MARKERS (24")	LF	300			
533-E			ELIM EXIST PVMT MRK AND RAISED MARKERS (SYMBOL)	EA	8			
533-F			ELIM EXIST PVMT MRK AND RAISED MARKERS (WORD)	EA	8			
533-G			ELIM EXIST PVMT MRK AND RAISED MARKERS (RR-XING)	EA	8			
535.1			4" WIDE YELLOW LINE	LF	38,800			
535.2			4" WIDE WHITE LINE	LF	54,300			
535.4			8" SOLID WHITE LINE	LF	6,000			
535.5			12" WIDE WHITE LINE	LF	1,150			
535.7			24" WIDE WHITE LINE	LF	3,500			
535.12			WORD "ONLY"	EA	15			

CITY OF SAN ANTONIO
025 UNIT PRICING FORM

PROJECT NAME: FY 2017 Asphalt Overlay Task Order - Package 5
PROJECT NO. 23-01474-5

ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
535.14			RAILROAD CROSSING SYMBOL	EA	8			
535.16			STRAIGHT WHITE ARROW BICYCLE FACILITY	EA	15			
535.17			BICYCLE RIDER SYMBOL	EA	20			
535.22			WHITE SHARROW (BIKE SHARED LANE)	EA	20			
535.23			WHITE ARROW (LEFT/RIGHT/STRAIGHT)	EA	55			
537.1			TRAFFIC BUTTON (TYPE W)	EA	230			
537.2			TRAFFIC BUTTON (TYPE Y)	EA	230			
537.6			PAVEMENT MARKER (TYPE I-C)	EA	2,300			
537.8			PAVEMENT MARKER (TYPE II A-A)	EA	1,900			
537.9			PAVEMENT MARKER (TYPE II C-R)	EA	650			
556.1			CAST IN PLACE DETECTABLE WARNING SURFACE TILES	EA	50			
624.2			GROUND BOXES TYPE B (122322)	EA	10			
712			JOINT AND CRACK SEALING	LB	6,500			
798			ASPHALT CONCRETE CUSHION SPEED HUMPS, TYPE 3	EA	45			
SUP 1			DOOR HANGERS	LS	1			
SUP 2			POLICE OFFICER	HR	600			
SUP 3			RAILROAD INSURANCE AND PERMIT	LS	1			
SUP 4			LAPTOP AND INTERNET ACCESS	LS	1			
SUP 5			TCI AT WORK P ROJECT SIGN	EA	20			
SUP 6			PORTABLE CHANGEABLE MESSAGE SIGN (ELECTRONIC MESSAGE BOARD)	MO	10			
SUP 7			ADDITIONAL MOBILIZATION	EA	5			
						Total CoSA Bid Amount:		

CITY OF SAN ANTONIO
025 UNIT PRICING FORM

PROJECT NAME: FY 2017 Asphalt Overlay Task Order - Package 5
PROJECT NO. 23-01474-5

ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
SAWS WATER BID ITEMS								
826			SAWS VALVE BOX ADJUSTMENT	EA	350			
826A			VALVE BOX LOCATE AND ADJUSTMENT (SAWS)	EA	10			
						Subtotal SAWS Water Bid Amount:		
SAWS SANITARY SEWER BID ITEMS								
851			ADJUSTING EXISTING MANHOLES (SAWS)	EA	275			
851A			LOCATING AND ADJUSTING EXISTING MANHOLES (SAWS)	EA	10			
						Subtotal SAWS Sanitary Sewer Bid Amount:		
						Total SAWS Bid Amount:		
CPS ENERGY BID ITEMS								
512.1A			ADJUSTING EXISTING MANHOLES (CPS)	EA	5			
512.3A			ADJUSTING EXISTING VALVE BOXES (CPS)	EA	50			
						Total CPS Energy Bid Amount:		
						Total (CoSA + SAWS + CPS) Bid Amount:		

_____certifies that the unit prices shown on this complete computer print-out for all of the bid items and the alternates contained in this proposal are the unit prices intended and that its bid will be tabulated using these unit prices and no other information from this print-out.

_____Acknowleged and agrees that the total bid amount shown will be read as its total bid and further agrees that the official total bid amount will be determined by multiplying the unit bid prices shown in this print-out by the respective estimated quantities shown in the proposal and then totaling all of the extended amounts. _____ agrees to the terms, conditions, and requirements of the bidder's bid proposal.

Signed: _____ Date: _____

Title: _____

CITY OF SAN ANTONIO, TEXAS

GOVERNING SPECIFICATIONS, SPECIAL SPECIFICATIONS, SPECIAL PROVISIONS, AND SUPPLEMENTAL SPECIFICATIONS
FOR

2017 ASPHALT OVERLAY TASK ORDER PACKAGE 5

All Standard Specifications and Special Specifications applicable to this project are identified as follows:

CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION JUNE, 2008 AND SPECIAL PROVISIONS DATED MAY 2009, FEBRUARY 2010, JUNE 2010 and NOVEMBER 2013

ITEM		DESCRIPTION
100	-	MOBILIZATION
101	-	PREPARING RIGHT-OF-WAY
103	-	REMOVE CONCRETE
104	-	STREET EXCAVATION
107	-	EMBANKMENT
200	-	FLEXIBLE BASE
203	-	TACK COAT
204	-	SURFACE TREATMENTS
205	-	HOT MIX ASPHALTIC CONCRETE PAVEMENT
208	-	SALVAGING, HAULING AND STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT
209	-	CONCRETE PAVEMENT
210	-	ROLLING
220	-	BLADING
230	-	BASE AND PAVEMENT REPLACEMENT

300 - CONCRETE

301 - REINFORCING STEEL

302 - METAL FOR STRUCTURES

303 - WELDED WIRE FLAT SHEETS

307 - CONCRETE STRUCTURES

311 - CONCRETE SURFACE FINISH

407 - CONCRETE EASEMENT, CRADLES, SADDLES, AND COLLARS

500 - CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER

502 - CONCRETE SIDEWALKS

503 - ASPHALTIC CONCRETE, PORTLAND CEMENT CONCRETE, AND GRAVEL DRIVEWAYS

506 - CONCRETE RETAINING WALLS – COMBINATION TYPE

512 - ADJUSTING EXISTING MANHOLES AND VALVE BOXES

515 - TOPSOIL

516 - SODDING

530 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

533 - CLEANING AND REMOVAL OF PAVEMENT MARKINGS AND MARKERS

535 - HOT APPLIED THERMOPLASTIC PAVEMENT MARKINGS

537 - RAISED PAVEMENT MARKERS

540 - TEMPORARY EROSION, SEDIMENTATION & WATER POLLUTION PREVENTION & CONTROL

556 - CAST IN PLACE DETECTABLE WARNING SURFACE TILES

624 - GROUND BOXES

1000 - WEB PORTAL

TEXAS DEPARTMENT OF TRANSPORTATION
STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES JUNE, 2004

438 - CLEANING AND SEALING JOINTS AND CRACKS (RIGID PAVEMENT AND BRIDGE DECKS)

454 - BRIDGE EXPANSION JOINTS

712 - CLEANING AND SEALING JOINTS AND CRACKS

SAN ANTONIO WATER SYSTEM
STANDARD SPECIFICATIONS FOR CONSTRUCTION APRIL, 2014

826 - VALVE BOX ADJUSTMENT

851 - ADJUSTING EXISTING MANHOLE

CPS ENERGY STANDARDS SPECIFICATIONS FOR CONSTRUCTION

CPS VALVE BOX AND MANHOLE ADJUSTMENT

SPECIAL SPECIFICATIONS FOR CONSTRUCTION

250 - SEAL COAT

798 - SPEED HUMPS, TYPE III ASPHALT CONCRETE CUSHIONS

826A - VALVE BOX LOCATE AND ADJUSTMENT

851A - MANHOLE LOCATE AND ADJUSTMENT

CITY OF SAN ANTONIO
SPECIAL PROVISIONS FOR CONSTRUCTION

205 - HOT MIX ASPHALTIC CONCRETE PAVEMENT

230 - BASE AND PAVEMENT REPLACEMENT

502 - CONCRETE SIDEWALKS

503 - ASPHALTIC CONCRETE, PORTLAND CEMENT CONCRETE, AND GRAVEL DRIVEWAYS

533 - CLEANING AND REMOVAL OF PAVEMENT MARKINGS AND MARKERS

535 - HOT APPLIED THERMOPLASTIC PAVEMENT MARKINGS

556 - CAST IN PLACE DETECTABLE WARNING SURFACE TILES

TEXAS DEPARTMENT OF TRANSPORTATION SPECIAL PROVISIONS FOR CONSTRUCTION

712 - CLEANING AND SEALING JOINTS AND CRACKS

CRAFCO PRODUCT DATA SHEET – ASPHALT RUBBER 541

SUPPLEMENTAL SPECIFICATIONS FOR CONSTRUCTION

SUP 1 – DOOR HANGERS

SUP 2 – POLICE OFFICER

SUP 3 – RAILROAD INSURANCE AND PERMIT

SUP 4 – LAPTOP AND WIRELESS INTERNET ACCESS

SUP 5 – TCI "AT WORK" PROJECT SIGN

SUP 6 – PORTABLE CHANGEABLE MESSAGE SIGN (ELECTRONIC MESSAGE BOARD)

SUP 7 – ADDITIONAL MOBILIZATION

SPECIAL DETAILS FOR CONSTRUCTION

TCI AT WORK PROJECT SIGN DETAIL

MANHOLE ENCASEMENT DETAIL

ASPHALT OVERLAY DETAIL

COSA SPEED HUMP, TYPE III ASPHALT CONCRETE CUSHION DETAILS

COSA WHEELCHAIR RAMP STANDARDS

COSA MISCELLANEOUS CONSTRUCTION STANDARDS I

COSA MISCELLANEOUS CONSTRUCTION STANDARDS II

COSA CONCRETE BUS PAD STANDARD

COSA CONCRETE DRIVEWAY STANDARDS

COSA STANDARD PAVEMENT MARKINGS DETAILS

COSA BARRICADE AND CONSTRUCTION STANDARDS

TXDOT PEDESTRIAN FACILITIES – CURB RAMPS

TXDOT TRAFFIC CONTROL STANDARDS

GENERAL NOTES FOR CONSTRUCTION

GENERAL NOTES FOR ASPHALT OVERLAY PROJECTS

ITEM 250
Special Specification

SEAL COAT

250.1 DESCRIPTION:
This item shall consist of a single asphalt surface treatment composed of asphalt surface treatment composed of asphalt material covered with aggregate for the purposed of sealing existing pavements in accordance with these specifications.

250.2 MATERIALS:

A. AGGREGATE:
Aggregates shall be of the type as shown on the plans and shall meet all the requirements of the Texas Department of Transportation (TxDOT) Item No. 302, "Aggregate for Surface Treatments" and subsequent revisions thereto. Gradation requirements when tested by TxDOT Test Method Tex-200F, Part I, shall be as shown on the plans.

B. ASPHALTIC MATERIALS:
Asphalt cement, emulsified asphalts, other miscellaneous asphaltic materials, and latex additives shall conform to TxDOT Item No. 300, "Asphalt, Oils, and Emulsions" and subsequent revisions thereto.

250.3 EQUIPMENT

A. DISTRIBUTOR:
The distributor shall be a self-propelled pressure type, equipped with an asphaltic material heater and a distributing pump capable of pumping the material at the specified rate through the distributor spray bar. The distributor spray bar shall be capable of fully circulating the asphaltic material. The distributor spray bar shall contain nipples and valves so constructed that the nipples will not become partially plugged with congealing asphaltic material, in order to prevent streaking or irregular distribution of asphaltic material. Distributor equipment shall include a tachometer, pressure gauges, volume measuring devices, and thermometer for reading the temperature of tank contents.

The distributor tank shall have been calibrated within three (3) years from the date it is first used on this project. The tank calibration procedure shall be in accordance with Test Method Tex-922-K, Part 1, and shall be signed and sealed by a registered professional engineer. Unless otherwise shown on the plans, the Contractor shall provide the tank calibration and shall furnish the Engineer an accurate and satisfactory calibration record prior to beginning the work. The Engineer may at any time verify calibration accuracy in accordance with Test Method Tex-922-K, Part II, and may perform the recalibration if the calibration is found to be in error.

B. AGGREGATE SPREADER:
A self-propelled continuous-feed aggregate spreader shall be used which will uniformly spread aggregate at the rate specified by the Engineer.

C. ROLLERS:
Approved rolling equipment shall be of the self-propelled type and shall be so designed such that a 12 ton load may be obtained by ballast loading. The roller shall be equipped with tires that will afford ground contact pressures to 90 psi or more. Individual tire inflation pressures shall be within 5 psi of each other. The operation load and tire air pressure shall be within the range of the manufacture's chart.

D. SWEEPERS:
A rotary, self-propelled power broom shall be acceptable for sweeping existing pavement surfaces.
Vacuum sweepers or other approved equally capable equipment shall be suitable for removing loose aggregate form compacted Seal Coat.

250.4 CONSTRUCTION METHOD:

Prior to Seal Coating, all dirt and other objectionable material shall be removed from the existing pavement by sweeping or other approved methods. All existing raised pavement markings shall be removed daily, as the work progresses, and as approved by the Engineer. All vegetation found in the existing pavement shall be destroyed by an approved chemical killer.

Building paper shall be place over all manholes, valve boxes, grates, etc., so as to protect the surfaces from Asphaltic materials. Asphaltic materials shall not be placed, lapped, or splashed onto adjacent structures.

Seal Coat shall not be applied when the air temperature is below 60^0F and is falling, but it may be applied when the air temperature is 50^0F and is rising, the air temperature being taken in the shade and away from artificial heat. Seal Coat shall not be applied when the roadway surface temperature is below 60^0F or when in the opinion of the Engineer, general weather conditions are not suitable. When latex modified asphalt cement is specified, Seal Coat shall not be applied when the air temperature is below 80^0F and is falling, but may be applied when the air temperature is above 70^0F and is rising and shall not be applied when the temperature of the surface on which the Seal Coat is to be applied is below 70^0F.

Asphalt and aggregate rates as shown on the plans are for estimate purposes only an may be varied as directed by the Engineer.

The width of each application of Asphaltic material shall be such to allow uniform application and immediate covering with aggregate. The contractor shall be responsible for uniform application of asphaltic material at the junction of distributor loads. Paper or other suitable material shall be used to prevent overlapping of transverse joints. Longitudinal joints shall match lane lines unless otherwise authorized by the Engineer. Application of asphaltic material will be measured as necessary to determine the rate of application. In those areas where the asphalt distributor is not accessible, hand spraying may be permitted as directed by the Engineer.

Aggregate shall be immediately and uniformly applied and spread in the same width as the application of asphaltic material. The entire surface shall then be broomed or raked as required by the Engineer.

The aggregate shall be rolled for its width with a minimum of two (2) pneumatic tires rollers which shall be maintained in good repair and operating condition. Rolling shall begin as soon as sufficient aggregate is spread to prevent pick-up and shall begin longitudinally at the outside edge of the mat and progress toward the center of the mat, uniformly lapping each preceding pass by at least 2 the width of the roller. Rolling shall continue until no more aggregate can be worked into the surface.

After all rolling, the finished surface shall be cleared of any surplus aggregate by the Contractor by sweeping. Until the work has been accepted, additional sweeping shall be required as often as necessary so that loose aggregate does not present a hazard to traffic.

The Contractor shall be responsible for the maintenance of the Seal Coat until the work is accepted by the Engineer. All holes or failures in the surface shall be repaired by use of additional asphalt and aggregate. All fat or bleeding surfaces shall covered with approved cover material in such a manner that the asphaltic material will not adhere to or be picked up by the wheels of vehicles.

All parkways, private property, and driveways adjacent to the work shall be cleaned of loose aggregate and other debris as produced from Seal Coat operations.

250.5 MEASUREMENT:
Seal Coat: will be measured by the square yard of completed and accepted work

250.6 PAYMENT:
The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for "Seal Coat", which price shall be full compensation for furnishing and placing all materials, sweeping, rolling, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

PAY ITEM NO. 250: SEAL COAT - per square yard.

ITEM 798
SPECIAL SPECIFICATION

ASPHALT CONCRETE CUSHION
SPEED HUMPS, TYPE 3

Asphalt Concrete Speed Humps

Description
Work consists of construction of speed humps as required in contract documents and as directed by Project Engineer.

For the purpose of this specification, all references are in accordance with COSA Standard Specifications latest edition.

General
Locations of speed hump to be approved by COSA Traffic Engineer Division prior to installation.

Speed hump shall not be installed such that roadway drainage is compromised.

The Contractor shall contact the Engineer for coordination a minimum of three (3) working days prior to the construction of the speed humps.

The Contractor shall furnish and use canvas tarpaulins to cover all loads of asphalt from the time that the mixture is loaded until it is discharged from the delivery vehicle, unless otherwise directed in writing by the Engineer.

MATERIALS

Asphalt
Asphalt concrete shall be Type D, PG 64-22, in accordance with the provisions of Item 205, "Hot Mix Asphaltic Concrete Pavement," of the Standard Specifications.

Tack Coat

Tack coat must be applied prior to installation of all speed humps along all edges of milled limits. Tack coat shall be SS-1H type emulsion applied at a rate of 0.02 gallons per square yard up to a maximum of 0.10 gallons per square yard.

The area to which tack coat has been applied shall be closed to public traffic. Care shall be taken to avoid tracking binder material onto existing pavement and concrete surfaces beyond the limits of construction.

No traffic shall be allowed on to the area to which tack coat has been applied with the exception of vehicles unloading asphalt concrete. All vehicles involved with the

Contractor's operations shall turn around within the road right-of-way. Driveways and other private property shall not be used without prior written consent of the involved property owner, a dated copy of which shall be delivered to the Engineer prior to the use thereof.

Striping
Pavement markings shall be white in color, triangular in shape and placed on the Asphalt Hump as shown on Hump detail. Striping to be placed in accordance with Item 535 "Hot Applied Thermoplastic Pavement Markings." White temporary tabs shall be placed the same day the speed humps are installed. Payment for temporary tabs is subsidiary to the cost of speed humps. Permanent striping shall be completed 7 to 14 days after installation of the speed humps.

Signs and Sign Post
Signs and Sign post shall be supplied by the contractor and installed per COSA specification 531 "Signs."

CONSTRUCTION DETAILS

General
At least 5 calendar days prior to commencing installation of speed humps, contractor is to provide written notification of planned work to the residents of the street receiving such treatment, residents of any intersecting streets up to one block away, and to Project manager. Project Manager will notify Office of Emergency Services, local City office, City School Districts and any other interested parties that installation of speed humps is scheduled to take place.

Notification of residents is to be type written and shall contain information informing the residents of planned work, and is to be approved by Project Manager before distribution. Notification is to be placed on front door and distributed to all residents as required. Contractor shall not place notices in property owner's mailbox.

In conjunction with construction of speed humps, contractor will install all required signage and sign posts. Contractor is responsible to coordinate installation of required signage and sign posts with the construction of speed hump, and is to notify COSA Traffic Engineering at 207-2075 minimum of 10 working days in advance of commencing construction of speed hump.

Existing street can be temporarily closed on daily basis and during working hours only while speed hump construction is taking place. Existing street must be fully accessible to vehicular traffic at end of each work day. Street closure is to be done with use of appropriate traffic control signs and devises required to maintain and protect traffic per applicable TMUTCD standards.

Adjacent areas disturbed or damaged during construction are to be restored, in kind to satisfaction of Project Manager, immediately following completion of speed hump construction at contractor's expense.

Construction Performance Standards
The Engineer will not accept any speed hump that is less than three inches (3 ") in height or exceeds a maximum three and one quarter inches (3 1/4") in height or that is not of the shape shown in the Type 3, Speed Hump Detail.

Cross section and profile of each and every speed hump are to be surveyed to verify that each speed hump has been constructed in required shape, and that it falls with required tolerance range.

Take any steps necessary to correct any deficiencies that fall outside of required tolerance.

Construction Installation
Speed humps are to be constructed of asphalt surface course as described in speed hump details.

Use any method necessary to form shape as described in Asphalt Concrete Speed Hump Detail and to achieve proper height of speed hump.

Do not perform final rolling operation until required shape of each speed hump in turn has been verified in accordance with applicable tolerances. Contractor to take into account compaction to achieve required dimensions.

Pavement Markings are to be installed according to item 535 Hot Applied Thermoplastic Pavement Markings.

Sawcut existing asphalt to the shape of the new speed hump and mill out a minimum of 2.0 inches of existing material for installation of proposed speed hump. Thoroughly clean pavement surface and apply tack coat making sure to completely cover surface area. Tack coat must be applied before placement of new asphalt material, and between any and subsequent asphalt courses.

Unless otherwise directed by the engineer or designated City Staff, the Contractor shall install posts, speed hump warning and advisory speed signs at the exact locations marked by the Engineer or designated City staff on the pavement in advance of each speed hump. The sign location list and map provided with the Notice to Proceed will show the general locations only. Permanent warning and advisory signs may be installed prior to construction of speed humps. If installed more than one week prior to construction, signs shall remain covered until construction is completed. If not installed prior to construction, warning and advisory signs must be installed within 48 hours of construction.

The Contractor shall construct speed humps at the exact locations marked on the pavement by the Engineer or designated City staff. The speed hump street list and location maps provided with the Notice to Proceed for each phase of the project will show the general locations only.

Street widths in exhibits provided with each Notice to Proceed are measured from lip-of-gutter to lip- of-gutter or face of curb to face of curb as applicable. Measurements are approximate only.

Measurement
Speed humps shall be measured by each hump placed. Saw cutting, excavating and disposal of existing material underneath proposed location of asphalt speed hump will not be measured for payment. Tack Coat will also not be measured for payment
The Engineer shall make final measurements in the field.

White temporary tabs will not be measured for payment as they are considered subsidiary to the cost of speed humps.

Permanent striping will be measured the linear footage of striping installed as per Item 535 "Hot Applied Thermoplastic Pavement Markings."

Payment
The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid per Each for "Asphalt Concrete Speed Cushion, Type 3." This price is full compensation for removal and disposal of existing speed hump (rubber or asphalt), removal and disposal of existing asphaltic material where proposed speed hump is to be installed, saw cutting, excavation, asphalt, tack coat, installation, and equipment, labor, materials, tools and other incidentals required to complete the task.

Payment for linear pavement markings will be placed under applicable items for Item 535 "Hot Applied Thermoplastic Pavement Markings."

Payment for triangular markings on asphalt cushions shall not be paid for directly, but shall be considered subsidiary to the cost of the individual cushion.

Payment for signs will be placed under applicable items for Item 531 Signs.

Surface restoration shall consist of restoring all areas within the limits of work to their original existing condition prior to construction.

The Contractor shall restore all paved areas, such as driveways, curb and gutter, roadway surfaces, ditches, landscaped areas, etc., and all other improvements disturbed or damaged by his operations at no additional cost to the City.

Payment for the restoration of damaged areas, for which specific bid items are not provided, shall be included in the contract prices paid for various items of work, and no additional compensation will be allowed therefore.

ITEM NO. 826-a

LOCATING AND ADJUSTING EXISTING VALVE BOXES

826-a 1. DESCRIPTION: This item shall consist of locating valve boxes, cutting asphalt, replacing asphalt, and adjustment of all existing valve boxes in accordance with these applications and as directed by the Engineer or Project Manager.

826-a 2. MATERIALS: The materials for valve boxes shall conform to the specifications contained within the latest revision of SAWS Material Specification Item No. 10-20, Valve Boxes."

826-a 3. CONSTRUCTION: Construction Methods: Locate valve box using maps and metal detectors. Cut and replace asphalt as necessary. The valve box shall be placed in such a manner to prevent shock or stress from being transmitted to the valve. It shall be centered and plumb over the operating nut of the valve with the box cover flush with the surface of the finished pavement or at such other level as may be directed by the Engineer or Project Manager.

Valve box shall be located so that the valve operating nut is readily accessible for operation through the opening to the valve box. The valve box shall be set flush with the surface of the finished pavement or at such other elevations as may be specified. Pits shall be constructed to permit trainer valve repairs and to afford protection to valve and pipe from impact where they pass through the pit walls.

Existing Valve Box: Existing covered valve boxes shall be defined as those boxes which are located within the right-of-way of the specified area of construction operations which are covered by asphalt. These boxes shall be adjusted to match proposed finished grades.

Adjustment of new valve boxes installed by SAWS will be paid at the contract unit price bid for Item 826 Valve Box Adjustment.

On each individual project, valve boxes shall be adjusted to finished grade within 10 days maximum of the final surface mat.

826-a 4. MEASUREMENT: Valve Boxes located and completely adjusted, as prescribed above, will be measured by the unit of each valve box located and adjusted to the finished grade. The excavation and the amount of asphalt required to fill the area excavated will not be measured for payment.

826-a 5. PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per valve box for "Locating and Adjusting Existing Valve Boxes" which price shall be full compensation for all excavation, including saw cutting of surfaces as required, and disposal of material excavated; for furnishing and placing all materials and for all labor, tools, equipment and incidentals necessary to complete the work.

ITEM NO. 851-a

LOCATING AND ADJUSTING EXISTING MANHOLES

851-a 1. DESCRIPTION: This item shall consist of the locating manholes, cutting asphalt, replacing asphalt, and adjustment of all existing manholes to include the replacing of existing manhole covers and rings regardless of type shown on the plans and in conformity with the provisions of these specifications.

851-a 2. CONSTRUCTION: Locate manholes using maps and metal detectors. Cut and replace asphalt as necessary. Manholes shall be lowered below subgrade before placing base materials and openings shall be protected by temporary hatch covers. Existing manhole rings and covers which are determined by the SAWS inspector to be in an unacceptable condition, will be removed and replaced with new rings and cover. Contractor shall take all necessary measures to prevent damage to existing or new rings, covers, or cones from equipment and materials used in, or taken through, the work area. If an existing or new manhole cover, ring, or cone is damaged by the Contractor, it shall be replaced (as directed by SAWS inspector) by the Contractor at his expense. Manholes shall be adjusted after the base material has been laid and before placement of the final surface course. Manholes that are going to be adjusted on an existing surface course (not planned for replacement) will be in accordance with City of San Antonio Utility Excavation Criteria Manual Standard Drawing No. 8.8. All manholes shall then be raised, or lowered a sufficient height so as to be level with the finished surface course. Adjustment in height will be made by the addition or removal of "throat rings" above the manhole cone, where feasible. A minimum of two and a maximum of six "throat rings" shall be used at each adjusted manhole. Material excavation from around the manholes shall be replaced with concrete in accordance with Standard Drawings, and select materials from the excavation (as shown on the plans or specified by the SAWS). All excess materials shall be disposed of by the Contractor at his own expense in an approved location. Contractor shall furnish and install a 5' x 5' x 1" thick steel plate over concrete collars at the discretion of the city Engineer or Project Manager. Steel plate shall not be removed until concrete collar around manhole has reached its ultimate strength.

On each individual project, manholes shall be adjusted to finished grade and concrete collars in place within 10 days maximum of the final surface mat.

851-a 3. MEASUREMENT: Manholes located and completely adjusted, as prescribed above, will be measured by the unit of each manhole located and adjusted. The excavation, steel plate and the amount of asphalt, concrete or reinforced concrete as necessary to fill the area excavated will not be measured for payment.

851-a 4. PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per manhole for "Locating and Adjusting Existing Manholes" which price shall be full compensation for all excavation, including saw cutting of surfaces as required, reinforced concrete and disposal of material excavated, 5' x 5' x 1" thick steel plate; for furnishing and placing all materials and for all labor, tools, equipment and incidentals necessary to complete the work.

SPECIFICATION FOR THE ADJUSTMENT OF VALVE BOXES AND CATHODIC PROTECTION TEST STATIONS

Description: This specification covers the adjustment of existing valve boxes, test riser boxes, cathodic protection test stations and manholes for regulator vaults on CPS Energy facilities in accordance with these specifications and as directed by the authorized CPS Energy representative.

Materials: All valve boxes, lids, test stations and adjustment rings will be provided by CPS Energy. These materials are available at the CPS Energy construction centers and may be picked up by the Contractor during CPS Energy regular business hours. All unused materials are to be returned to the construction center where it was obtained. Any returned material that is damaged or otherwise deemed to be unusable by CPS Energy shall be billed to the Contractor. Payment of the final invoice for the adjustment work will not be made until all material quantities are verified and materials are returned. Any boxes damaged by milling or other construction operations, shall be replaced by the Contractor at his expense.

Adjustments: The locations for the adjustments shall be as shown on the plans provided to the Contractor. For the purposes of this specification plans may include, but are not limited to, plan sheets, excel spreadsheets or other forms of data that provide the Gas Contractor with information to locate the device to be adjusted. The Gas Contractor shall verify with the CPS Energy authorized representative that a gas leak survey has been performed and that CPS Energy has completed all necessary leak repairs prior to the commence of the road work.

Once the Gas Contractor has received the plans, the Gas Contractor shall visually inspect each location and verify the need for adjustment based on the roadway plans with the CPS Energy Authorized Representative. The Gas Contractor shall also verify that valve boxes are vertical so that a valve key can operate the valve. If there is debris in the valve box, the Gas Contractor shall remove the debris from the box. The Gas Contractor shall also determine if test risers require adjustment. If the test riser requires adjustment, the Gas Contractor shall notify the CPS Energy Authorized Representative to arrange for a CPS Energy Crew to adjust the riser. For cathodic protection boxes, the Gas Contractor shall verify that the box is neat and clean. If the wires are missing or need attention, the Gas Contractor shall notify the CPS Energy Authorized Representative so that a CPS Energy Crew can repair the cathodic protection leads. After the roadway work is completed, the Gas Contractor shall verify the work is completed, with the CPS Energy Authorized Representative, by taking a photograph inside the valve box, cathodic protection box, test riser box or regulator box.

The Gas Contractor shall coordinate with the General Contractor to adjust the valve boxes to meet the General Contractors schedule and elevations. The valve boxes shall be adjusted in such a manner as to prevent shock or stress from being transmitted to

the valve. It shall be centered and plumb over the operating nut with the box cover flush with the surface of the completed road surface. If valve boxes contain debris, the Gas Contractor shall remove the debris from the valve box. During construction, it is the General Contractors responsibility to maintain access to all gas valves during the construction period. No valves may be covered with dirt, asphalt or other debris that would hinder accessing their location in an emergency.

The Gas Contractor shall coordinate with the General Contractor to adjust cathodic protection and test riser boxes to meet the General Contractors schedule and elevations. The boxes shall be adjusted in such a manner to ensure that the cathodic protection leads and the test risers remain intact and accessible. The Gas Contractor is responsible for adjusting the box to final grade after adjustment of the test riser is completed by a CPS Energy Crew.

Regulator vault access manholes vary in size and may contain more than one access manhole. The Gas Contractor shall determine the size of the opening during the initial inspection with the CPS Energy Authorized Representative, prior to requesting materials. The Gas Contractor shall coordinate with the General Contractor to adjust the regulator access manholes to meet the General Contractors schedule.

For boxes that are located in concrete, the Gas Contractor shall adjust the box to final grade and monitor the box during concrete placement to ensure that concrete does no enter the interior of the box. The Gas Contractor shall remove any concrete inside the box at no additional expense to CPS Energy.

If during construction, boxes are discovered that are not shown in the plans, the Gas Contractor shall notify the CPS Energy Authorized Representative. The Gas Contractor shall inspect and adjust the box or access manhole as described above.

On each individual project, manholes shall be adjusted to finished grade and concrete collars in place within 10 days maximum of the final surface mat.

Measurement: Adjustment of valve boxes shall be measured as follows:

1) Adjust valve box that is clear, cathodic protection box or test riser box to grade, each.
2) Adjust valve box to grade and clean, each.
3) Adjust regulator access manhole, each.
4) Replace valve box from surface to top of valve, each.

Payment: Adjustment of valve boxes shall be paid as follows:

1) Adjust valve box that is clear, cathodic protection box or test riser box to grade, each.
2) Adjust valve box to grade and clean, each.
3) Adjust regulator access manhole, each.
4) Replace valve box from surface to top of valve, each.

SPECIAL PROVISION

Item 205 Hot Mix Asphaltic Concrete Pavement

Delete:
Section 205.5 Measurement in its entirety
Section 205.6 Payment 1st paragraph
Section 205.7 Bid Item in its entirety

Add:
Section 205.4 Construction G. Placement 7. Acceptable mat ranges
The thickness types used for Type D Asphalt for this Asphalt Overlay Contract shall be 2.0" Compacted depth. Below are acceptable average ranges 2.0" thick Type D Asphalt layers:

2.0" Compacted Depth (PG 64-22)
Shall be applied at 220 LBS/SY
Minimum Average Rate – 210 LBS/SY
Maximum Average Rate – 230 LBS/SY

Section 205.5 Measurement:
Hot Mix Asphaltic Concrete Pavement shall be measured by the tonnage, complete in place, as per the thickness specified by the Engineer or Project Manager. Limits of payment will be from face of curb to face of curb. Pavement area shall not exceed the limits shown on the plans without written authorization. In the event the average rate for 2.0" Type D Asphalt falls below the approved ranges as stated in this provision, the newly laid asphalt will not be measured for payment and shall be removed and replaced at the contractor's expense. For situations where the contractor exceeds the maximum average rate for 2.0" Type D Asphalt, the excess asphalt will not be measured for payment.

Section 205.6 Payment:
The work performed and materials furnished, as described by this item and measured as provided in this provision, shall be paid for at the contract unit bid price per ton of "Hot Mix Asphaltic Concrete Pavement," which price shall be full compensation for furnishing and placing all materials, and for all labor, tools, equipment and incidentals necessary to complete the work. The prime and tack coat, when required, shall be paid under the provisions of Item Nos. 202 and 203, respectively.

Trial batches will not be paid for unless they are incorporated into pavement work approved by the Engineer or Project Manager.

Pay adjustment for ride quality, when required on the plans, will be determined in accordance with TxDOT Standard Specification Item 585, "Ride Quality for Pavement Surfaces."

As specified in the Measurement section of this provision, if the specified thickness is not achieved and falls below the average acceptable rate, the contractor will not be paid and will be required to remove and replace the entire area that did not fall within the acceptable range at his expense. Once the average rate is satisfactorily met, the contractor will be paid at the contract unit bid price per ton of "Hot Mix Asphaltic Concrete Pavement" for the successful surface course mat.

If the contractor exceeds the maximum average rate as specified in this provision for 2.0" Type D Asphalt, the amount laid over maximum average rate for the specified thickness will not be paid.

For areas that are considered low spots that require additional Type D Asphalt, they will be paid under the Type D Level Up Bid Item. These locations must be brought to the attention of the Engineer or Project Manager and approved prior to beginning the overlay.

Section 205.7 Bid Item:

Item 205.4A – Hot Mix Asphaltic Pavement, Type D (2.0" Thick) (PG 64-22) – Per TON
Item 205.4B – Hot Mix Asphaltic Pavement, Type D (Level Up) (PG 64-22) – Per TON

SPECIAL PROVISION

Item 230 Base and Pavement Replacement

Delete:
Section 230.5 Measurement in its entirety
Section 230.6 Payment in its entirety
Section 230.7 Bid Item in its entirety

Add:
Section 230.4 Construction G. Placement & Acceptable Base Repair Ranges
The Engineer or Project Manager will make the determination on site what thickness is required for each base repair. The thickness types used for Type B Base and Pavement Replacement for this Asphalt Overlay Contract shall be either 6.0" or 12.0" Compacted depth as specified by the Engineer or Project Manager. Below are acceptable average ranges for 6.0" and 12.0" thick Type B asphalt base repair layers:

6.0" Compacted Depth (Type B)
Shall be applied at 660 LBS/SY
Minimum Average Rate – 630 LBS/SY
Maximum Average Rate – 690 LBS/SY

12.0" Compacted Depth (Type B)
Shall be applied at 1320 LBS/SY
Minimum Average Rate – 1255 LBS/SY
Maximum Average Rate – 1385 LBS/SY

Section 230.5 Measurement:
Type B Hot Mix Asphaltic Concrete Pavement Base and Pavement Repair shall be measured by the tonnage, complete in place, as per the thickness specified by the Engineer or Project Manager. Base repair area shall not exceed the limits discussed and confirmed between the Contractor and Engineer or Project Manager. In the event the average rate for a 6.0" Type B Asphalt base repair falls below the approved minimum rate as stated in this provision, measurement will not be taken and the Contractor will be required to remove and replace at his expense to meet the acceptable base repair range for 6.0". For situations where the contractor exceeds the maximum average rate for 6.0" and 12.0" Type B Asphalt for base repairs, the excess asphalt will not be measured for payment.

Section 230.6 Payment:
The work performed and materials furnished, as described by this item and measured as provided in this provision, shall be paid for at the contract unit bid price per ton of "Base and Pavement Repair. This price shall be full compensation for scarifying, removing objectionable or unstable material; furnishing and placing all materials; maintaining completed section before

surfacing; applying tack or prime coat; hauling, sprinkling, spreading and compacting; and for all labor, tools, equipment and incidentals necessary to complete the work.

As specified in the Measurement section of this provision, if the specified thickness for a 6.0" base repair falls below the average acceptable rate, the contractor will not be paid and will be required to remove and replace the entire area that did not fall within the acceptable range at his expense. Once the average rate for 6.0" is satisfactorily met, the contractor will be paid at the contract unit bid price per ton of "Hot Mix Asphaltic Concrete Pavement" for the successful surface course mat.

If the contractor exceeds the maximum average rate as specified in this provision for 6.0" and 12.0" Type B asphalt base repairs, the amount laid over maximum average rate for the specified thickness will not be paid.

Section 230.7 Bid Item:

Item 230.3A – Replacing Base and Pavement with Type B Pavement (6.0" Thick) – Per TON
Item 230.3B – Replacing Base and Pavement with Type B Pavement (12.0" Thick) – Per TON

SPECIAL PROVISION

Item 502 Concrete Sidewalks

For this project, Item 502 "Concrete Sidewalks" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Article 502.4. Construction F. Joints. This paragraph is void and replaced with the following:

Unless otherwise specified on plans or as agreed to by the Engineer, tooled joints with rounded edges well be placed at intervals equal to the sidewalk width and will be opened with one-half inch (½") radius by one and one-half inch (1 ½") depth and closed by one-half inch (½") radius by one-inch (1") depth.

1. **Expansion Joints.** Provide sidewalk sections separated by pre-molded or board joint ½ inch thick, or as shown on the plans, in lengths greater than 8 feet but less than 50 feet, unless otherwise directed. Terminate workday production at an expansion joint. Expansion joint material shall also be placed where the new construction abuts the existing curbs or driveway if the Engineer deems it necessary. The expansion joint material shall be placed vertically and shall extend the full depth and width of the concrete.

2. **Expansion Joint Dowels.** Unless otherwise shown on the plans, a minimum of two (2) round smooth dowel bars 3/8 inch in diameter and 18 inches in length shall be spaced 18 inches apart at each expansion joint. Nine inches (9") of each dowel shall be thoroughly coated with hot oil asphalt or greased, so that it will not bond to the concrete. Approved types of slip joints may be used in lieu of coating ends of dowels.

3. **Transverse Joints.** Sidewalks shall be marked with transverse "dummy" joints as shown on detail sheets, by the use of City approved jointing tools.

Article 502.4. Construction G. Curb Ramps. This paragraph is void and replaced with the following:

Curb ramps must include a detectable warning surface and conform to the details shown on the plans. Confirm that abrupt changes in sidewalk elevation do not exceed ¼ inch, sidewalk cross slope does not exceed 2%, curb ramp grade does not exceed 8.3%, and flares adjacent to the ramp do not exceed 10% slope.

Construct curb ramp to include the following provisions (no separate pay):

- Construct detectable warning surface with truncated domes conforming to the City of San Antonio Wheelchair Ramp Standards sheet.

- Remove existing flatwork in accordance with the specification for Item 103, except measurement and payment. Flatwork is defined as concrete curb, sidewalk, driveway, retaining wall, and miscellaneous concrete.

- Construct new curb in accordance with the specification for Item 500, except measurement and payment.

- Construct concrete retaining wall (combination type), up to a maximum height of 6 inches, in accordance with the specification for Item 506, except measurement and payment.

- Adjust or relocate existing signs as directed.

- Contractor shall not leave the ramp unattended more than 1 day.

- Concrete work shall be maintained free from graffiti of any kind.

- Relocate irrigation systems in accordance with the specification for Item 552, except measurement and payment.

- Contractor shall deliver flyers at least 2 days in advance.

- Relocate landscape as directed.

- Avoid damage to the property of others. Contractor will be held liable for damage.

- All ramps on individual projects shall be completed within 10 days maximum of the final surface mat.

Article 502.5. Measurement. This article is void and replaced with the following:

Sidewalks will be measured by the square yard of surface area at the depth specified.

Curb ramps will be measured by each unit. "Each unit" will consist of one curb ramp of the type specified in the plan, removal of existing flatwork, one landing and up to two wings, one detectable warning surface, new curb up to 24 feet in length, concrete retaining wall (combination type up to 6" in height), concrete surfaces up to a maximum of 13 square yards, sign adjustment or relocation, irrigation relocation, landscape relocation, and graffiti removal. Type I and Type III as per City of San Antonio Wheelchair Ramp Standards shall be measured as 2 EA of this item.

Article 502.6. Payment. This article is void and replaced with the following:

For Sidewalks – the work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid per square yard for "Concrete Sidewalks – Conventionally Formed". The price is full compensation for surface preparation of base; materials; excavation, hauling and disposal of excavated material; drilling and doweling into existing concrete curb, sidewalk and pavement; repair of adjacent street or pavement structure damaged by these operations; and equipment, labor, tools and incidentals.

For Curb Ramps – the work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Curb Ramps". This price is full compensation for removal and disposal of existing concrete; surface preparation of base; materials, excavation, hauling and disposal of excavated material; drilling and doweling into existing concrete curb, sidewalk and pavement; repair of adjacent street or pavement structure damaged by these operations; and equipment, labor, tools and incidentals. Concrete surface for a curb ramp exceeding 13 SY will be paid as Concrete Sidewalk per square yard. New concrete installation for a curb ramp exceeding 24 feet in length will be paid as Curb Item 500.

Article 502.7. Bid Item. This article is void and replaced with the following:

Item 502.1 – Concrete Sidewalks – Conventionally Formed – per SY
Item 502.1A – Curb Ramps - EA

SPECIAL PROVISION

Item 503 Asphaltic Concrete, Portland Cement Concrete and Gravel Driveways

Delete in its entirety:
Section 503.6 Payment

Add:
Section 503.6 Payment:
The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for "Portland Cement Concrete Driveway", Portland Cement Concrete Driveway – Commercial", "Asphaltic Concrete Driveway", or "Gravel Driveway", which price shall be full compensation for preparing the subgrade, for furnishing and placing all materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

SPECIAL PROVISION

Item 533 Cleaning and Removal of Pavement Markings and Markers

For this project, Item 533 "Cleaning and Removal of Pavement Markings and Markers" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Article 533.3. Equipment. This paragraph is void and replaced with the following:

All equipment shall be of sufficient capacity to clean the roadway surface to the specified cleanliness. Equipment shall be power driven and in good operating condition.

Article 533.4. Construction. The first paragraph is void and replaced with the following:

Unless otherwise shown on the plans, acceptable methods of removal for asphaltic pavements include heat scarification, blasting, and mechanical methods. Blasting and mechanical are the only acceptable methods for removal or cleaning of a Portland cement concrete surfaced pavement.

If truck mounted equipment is unable to achieve acceptable results in accordance to this specification, hand operated, power driven equipment, or equivalent, shall be used

Article A. is void and replaced with the following:

A. Removal of Existing Pavement Markings/Markers.

1. Existing Markings or markers to be removed shall be removed to the extent that the pavement marking or marker and its adhesive compound is/are either completely removed or obliterated.
2. Widths, lengths, and shapes of the cleaned surface shall be of sufficient size to include the full area of the specified pavement markings to be placed or removed.
3. Eliminate existing pavement markings and markers on both concrete and asphaltic surfaces in such a manner that color and texture contrast of the pavement surface will be held to a minimum. Repair damaged areas on asphaltic surfaces in excess of 1/8 inch in depth. Repair consists of milling and overlaying new asphaltic material in accordance to the appropriate San Antonio Standard Specifications. Width and length of the repair will be as directed by the Engineer or Project Manager.
4. Blasting or mechanical method of Portland cement concrete surfaces shall be sufficient to remove old pavement markings and all other contaminants. Damage to the roadway surface shall be avoided.

5. Very small particles of tightly adhering existing markings may remain in place if complete removal of the small particles will result in pavement damage.

Article 533.5. Measurement and Payment. This article is void and replaced with the following:

Removal of existing pavement markings shall be measured by the length of satisfactorily removed line, in feet, or as appropriate, the number of symbols or words which are satisfactorily removed. The accepted quantities shall be paid at the contract unit price, which shall be full compensation for furnishing all materials, labor, tools, equipment and supplies to remove the markings and any raised markers. Removal of raised pavement markers shall not be measured or paid for directly, but shall be considered subsidiary to the various items. Cleaning of new or existing pavements prior to installing new pavement markings or markers, and removal of incorrectly installed pavement markings and/or markers, shall not be paid for directly, but shall be considered subsidiary to the new pavement marking or marker.

Article 533.6. Bid Item. This paragraph is void and replaced with the following:

Bid Items:
533-A – Eliminate Existing Pavement Markings and Raised Markers (4") – LF
533-B – Eliminate Existing Pavement Markings and Raised Markers (8") - LF
533-C – Eliminate Existing Pavement Markings and Raised Markers (12") - LF
533-D – Eliminate Existing Pavement Markings and Raised Markers (24") - LF
533-E – Eliminate Existing Pavement Markings and Raised Markers (SYMBOL) – EA
533-F – Eliminate Existing Pavement Markings and Raised Markers (WORD) – EA
533-G – Eliminate Existing Pavement Markings and Raised Markers (RR-XING) – EA

SPECIAL PROVISION

Item 535 Hot Applied Thermoplastic Pavement Markings

For this project, Item 535 "Hot Applied Thermoplastic Pavement Markings" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Article 535.7. Bid Item. The following items are added:

Item 535.22 – White Sharrow (Bike Shared Lane) – EA, includes one bicycle symbol and two chevrons

Item 535.23 – White Arrow (Right, Left, or Straight) - EA

SPECIAL PROVISION

Item 556 Cast In Place Detectable Warning Surface Tiles

Delete in its entirety:
Section 556.5 Measurement
Section 556.6 Payment
Section 556.7 Bid Item

Add:
Section 556.5 Measurement:
Cast in Place Detectable Warning Surface Tiles will be measured by the unit of each surface tile installed that is outside the scope of a standard curb ramp as defined in the Special Provision for Item 502 Concrete Sidewalks. For curb ramps that include a single surface tile, or for Type I or III Ramps, payment for the surface tile will be covered by the Special Provision to Item 502 Concrete Sidewalks. The Special Provision to Item 556 covers payment for individual street corners that require multiple surface tiles along a single radius. Payment for this instance must be approved by the Project Manager or Engineer.

Section 556.6 Payment:
The work performed as prescribed by this item will be paid for at the contract unit price bid, per surface tile, for "Cast In Place Detectable Warning Surface Tiles" which price shall be full compensation for furnishing and placing all materials, manipulation, labor, tools, equipment and incidentals necessary to complete the work.

Section 556.7 Bid Item:

Item 556.1 – Cast In Place Detectable Warning Surface Tile – per Each

SPECIAL PROVISION

Item 712 Cleaning and Sealing Joints and Cracks (Asphaltic Concrete)

For this project, Item 712 "Cleaning and Sealilng Joints and Cracks (Asphalt Concrete)" of the TxDOT Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Article 712.2. Materials. This paragraph is void and replaced with the following:

Furnish a hot-applied, single component polymer/rubber modified asphalt material meeting the specifications of Crafco Asphalt Rubber 541 or approved equivalent.

CRAFCO INC
AN ERGON COMPANY
420 N. Roosevelt Ave. • Chandler AZ 85226
1-800-528-8242 • (602) 276-0406 • FAX (480) 961-0513
www.crafco.com

PRODUCT DATA SHEET

ASPHALT RUBBER 541

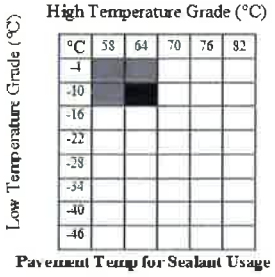
PART NO. 34541

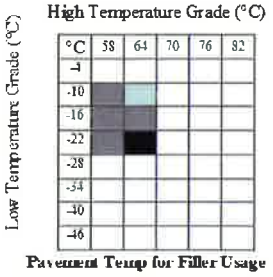
JANUARY 2008

READ BEFORE USING THIS PRODUCT

GENERAL Crafco Asphalt Rubber 541 is a hot-applied asphalt based product used to seal and fill cracks and joints in asphalt or portland cement concrete pavements in moderate to warm climates. Asphalt Rubber 541 is supplied in solid form which when melted and properly applied forms an adhesive and flexible compound that resists cracking in the winter and resists flow at summer temperatures. Asphalt Rubber 541 is used in highway, street, airfield and parking lot pavements and is applied to pavement cracks and joints using pressure feed melter applicators. At application temperature, Asphalt Rubber 541 is a higher viscosity, non self-leveling product. Asphalt Rubber 541 contains virgin rubber, vulcanized granulated crumb rubber, and selected paving asphalt. Asphalt rubber 541 is produced to meet requirements of the Texas Highway Department for Rubber Asphalt Crack Sealer. VOC = 0 g/L

USAGE GUIDELINES Asphalt Rubber 541 pavement temperature performance limits are 64-10 for crack sealing and 64-22 for crack filling. Usage recommendations are shown in Crafco pavement temperature grade charts shown at the right. Refer to Crafco Product Selection Procedures to determine sealant or filler use and pavement temperature grades.





SPECIFICATION CONFORMANCE Crafco Asphalt Rubber 541 meets all requirements of State of Texas Department of Highways for Rubber Asphalt Crack Sealer (Texas SDHPT Item 300.2 Class B) and exceeds requirements of ASTM D5078.

Test	Texas SDHPT 300.2 Class B Limits
Minimum Application Temperature	380°F (193°C)
Maximum Heating Temperature	400°F (204°C)
Cone Penetration, 77°F (25°C)	30-50
Cone Penetration, 32°F (0°C), 200 g 60 sec.	12 min.
Softening Point (ASTM D36)	170°F (77°C) min.
Flash Point, modified C.O.C.	400°F (204°C) min.
Virgin Rubber Polymer, % by wt.	2% min.
Granulated vulcanized rubber, % by wt.	13-17%
Bond@20°F (-7°C), 50% ext	Pass 3 cycles.

INSTALLATION Prior to use, the user must read and follow Installation Instructions for Hot-Applied RoadSaver, PolyFlex, Parking Lot and Asphalt Rubber Products to verify proper product selection, heating methods, pavement preparation procedures, application geometry, usage precautions and safety procedures. These instructions are provided with each pallet of product.

PACKAGING Packaging consists of individual boxes of product which are palletized into shipping units. Boxes contain a non-adherent film which permits easy removal of the product. Each pallet contains 72 boxes which are stacked in six layers of 12 boxes per layer. The weight of product in each box does not exceed 40 lbs. (18kg) and pallet weights do not exceed 2,880 lbs. (1310kg). Pallets of product are weighed and product is sold by the net weight of product. Product boxes are manufactured from double wall kraft board producing a minimum bursting test certification of 350 psi (241 N/cm^2) and using water resistant adhesives. Boxes use tape closure and do not contain any staples. Boxes are labeled with the product name, part number, lot number, specification conformance, application temperatures and safety instructions. Palletized units are protected from the weather using a three mil thick plastic bag, a weather and moisture resistant cap sheet and a minimum of two layers of six month u.v. protected stretch wrap. Pallets are labeled with the product part number, lot number and net weight. Installation Instructions are provided with each pallet in a weather resistant enclosure.

WARRANTY CRAFCO, Inc. warrants that CRAFCO products meet applicable ASTM, AASHTO, Federal or State specifications at time of shipment. Techniques used for the preparation of the cracks and joints prior to sealing or filling are beyond our control as are the use and application of the products; therefore, Crafco shall not be responsible for improperly applied or misused products. Remedies against Crafco, Inc., as agreed to by Crafco, are limited to replacing nonconforming product or refund (full or partial) of purchase price from Crafco, Inc. All claims for breach of this warranty must be made within three (3) months of the date of use or twelve (12) months from the date of delivery by Crafco, Inc. whichever is earlier. There shall be no other warranties expressed or implied. **For optimum performance, follow Crafco recommendations for product installation.**

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1-800-528-9242 • (602) 276-0406 • FAX (480) 961-0613
www.crafco.com

INSTALLATION INSTRUCTIONS

HOT-APPLIED ROADSAVER, POLYFLEX , PARKING LOT AND ASPHALT RUBBER PRODUCTS

JANUARY 2008

READ BEFORE USING THIS PRODUCT

GENERAL: These products are hot-applied, single component polymer/rubber modified asphalts supplied in solid form used to seal or fill cracks or joints in asphalt concrete or Portland cement concrete pavements. These products are not fuel resistant, and should not be used in fuel or oil spill prone areas. To use, product is removed from the package, heated in a melter and applied to the pavement. Details on product specifications, climate and usage suitability, and product selection are contained in Product Data Sheets.

MELTING AND APPLICATION: These products must be melted in jacketed double boiler melters with effective agitation that meet requirements of Appendix X1.1 of ASTM D6690. Crafco Supershot, EZ Series 2, and EZ Pour melters are recommended. Do not use direct fired or air heated machines. Heat transfer oil should not exceed 525°F (274°C). The melter must be capable of safely heating product to 400°F (204°C). **CAUTION:** Stop agitation when adding product to prevent splashing. Product is heated to between the minimum application temperature and the maximum heating temperature which are shown on product containers and Product Data Sheets. These products are most effectively applied with pressure feed wand systems. RoadSaver, PolyFlex and Parking Lot products can also be applied using gravity feed pour pots (Part No.40200 and 40201).

APPLICATION LIFE: Application life when heated to application temperature is approximately 12 to 15 hours and may be extended by adding fresh product as quantity in the melter decreases. Product shall be agitated during installation. Product may be reheated once to application temperature, after initial heat up. When application life has been exceeded, RoadSaver and Parking Lot products will thicken, become "stringy" and may then gel. If this occurs, product should immediately be removed from the melter and discarded. Asphalt Rubber and PolyFlex products will soften when overheated or heated for too long.

PAVEMENT TEMPERATURES: Apply product when pavement temperature exceeds 40°F (4°C). Lower temperatures may result in reduced adhesion due to presence of moisture or ice. If pavement temperature is lower than 40°F (4°C), it may be warmed using a heat lance (Part No. 45650) that puts no direct flame on the pavement. If installing at lower pavement temperature than 40°F (4°C), extreme care should be used to insure that cracks or joints are dry and free from ice and other contaminants. Product temperature should be maintained at the maximum heating temperature. If installing product at night, assure that dew is not forming on the pavement surface. Applied product should be checked by qualified personnel to assure that adhesion is adequate.

TRAFFIC CONTROLS: Place traffic controls in accordance with Part 6, Temporary Controls, of the FHWA Manual on Uniform Traffic Control devices (MUTCD) to protect the work site for the duration of the repairs.

CRACK / JOINT CLEANING: For appropriate adhesion, cracks or joints must be thoroughly clean and dry immediately prior to product installation. After widening or debris removal, and just prior to product installation, final cleaning shall use high pressure 90 psi (620kpa) minimum, dry, oil free compressed air to remove any remaining dust. Both sides of the crack or joint shall be cleaned. Surfaces should be inspected to assure adequate cleanliness and dryness.

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ASPHALT PAVEMENT CRACK SEALING: Crack sealing consists of installing extensible sealants into routed reservoirs in working cracks in pavements in good condition.

Reservoir Cutting: Based on the 98% LTPPBIND temperature range (difference from high to low), cracks are to be routed as follows:

Temperature Grade Range	Reservoir Width	Reservoir Depth
80°C or less	½" (12 mm)	¾" (19 mm)
86°C	¾" (19 mm)	¾" (19 mm)
92°C	1 1/8" (28 mm)	½" (12 mm)
98° or greater	1 ½" (38 mm)	½" (12 mm)

Reservoir width should not exceed 1 ½" (38 mm). Cutting should remove at least 1/8" (3 mm) from each side and produce vertical, intact surfaces with no loosely bonded aggregate. The pavement should be sound enough to resist significant spalling during cutting. Final reservoir width should not exceed twice the cutter width or 1 ½" (38 mm) maximum.

Installation and Finishing: After cleaning, sealant at the required temperature is installed in the reservoir. Sealant can be installed with up to a 3/8" (10 mm) underfill, flush fill, or with an overband cap that does not exceed 1/16" (1.5mm) above the pavement surface, and not greater than a 2" (50 mm) width beyond crack edges, depending on project specifications. These configurations are achieved using appropriate wand tips, shoes or squeegees. To reduce surface tack, Crafco DeTack or other approved material may be applied.

ASPHALT PAVEMENT CRACK FILLING: Crack filling consists of installing flexible, traffic resistant product into prepared, cleaned, non-working pavement cracks. Filler can be installed in routed or unrouted cracks or in surface overbands.

Routed Reservoir – Routed reservoirs are recommended for longest life. Guidelines for determining reservoir use are:

1. Crack density should not exceed approximately 20% (linear feet of cracks per square feet of pavement area).
2. Pavement should be sound enough to resist significant spalling during cutting. (Final reservoir width should not exceed double the cutter width, or 1 ½"(38 mm) maximum

Reservoir Dimensions – Determined as follows:

1. The cut should remove at least 1/8" (3mm) from each side of the crack and cut back to sound pavement.
2. Minimum width is ½"(12 mm), maximum is 1 ½"(38 mm).
3. Recommended cut depth is ¾"(19 mm).
4. Reservoirs are then cleaned with compressed air.

Cleaned Unrouted Cracks – Cracks may be cleaned and filled without reservoirs, but longer life is achieved with reservoirs. Cleaning consists of using high-pressure dry, clean compressed air, brushing, or vacuum techniques to remove debris.

Surface Overbands – Product can be applied in overbands after crack cleaning with compressed air. Overbands should not exceed 1/16" (1.5 mm) high above the pavement surface and not extend greater than 2" (50 mm) beyond each crack edge.

Filler Installation and Finishing – Same as sealant installation and finishing.

PORTLAND CEMENT CONCRETE PAVEMENT JOINT SEALING AND RESEALING: Joint sealing and resealing consist of

installing extensible sealants into sawn and cleaned joint reservoirs in PCC pavements.

Reservoir Sawing – New concrete should be cured for at least 7 days prior to sawing the joint reservoir. Joint spacing should be at the design dimension, generally from approximately 12 to 20 ft. (3.7 to 6.2m). Joints shall be at least ¼" (6mm) wide, and should not exceed 1½" (38mm). For new pavements designed with narrow joints using the initial narrow saw cut as the reservoir, spaced at 15 ft (5m) maximum, and when using low modulus type sealants, joint width may be as narrow as 1/8 inch (3mm). Contact Crafco for more details. Reservoir depth should allow a sealant depth to width ratio of 1:1 to 2:1, sufficient depth for backer rod, and the specified surface recess. Reservoirs shall be cut no deeper than required. When resealing, old sealant can be removed by knives, plows or sawing. Sawing shall slightly widen the joint by 1/8 to ¼ inch (3-6mm) to remove all traces of old sealant and produce clean, intact vertical surfaces. Maximum joint width is 1 ½ inch (38mm).

Reservoir Cleaning – After sawing, joints shall be flushed with water to remove sawing slurry and allowed to dry. Just prior to installing sealant, both joint surfaces shall be cleaned using sandblasting, brushing or other means to remove any remaining of sawing residue. Final cleaning is then done with high-pressure (minimum 90 psi, 62N/cm2) clean, dry, oil free compressed air the same day that sealant is installed. Moisture and oil traps are required on the compressor. Joints must be inspected to assure cleanliness by rubbing a finger along each face to spot dust or other contaminants. If found, recleaning should occur until joints are completely clean and dry. The objective of sawing and cleaning is to provide vertical, intact, clean concrete bonding surfaces free from all contaminants and are dry.

Backer Rod – After cleaning, heat resistant backer rod (ASTM D5249, Type I) approx. 25% larger than the joint width shall be installed to the required depth without damage or punctures. Punctures or damage to backer rod may cause sealant bubbling.

Sealant Installation – Concrete should be cured at least 7 days prior to installing sealant. Sealant heated to required temperature is installed per project specifications. Typical installations include a recess up to ¼ inch (6mm), flush, or with a surface overband (maximum 1/16" (1.5mm) above the surface, and 2" (50 mm) maximum beyond each joint edge).

INSTALLATION PRECAUTIONS: In certain situations, additional consideration needs to be given to product selection and application geometries.

Parking lots and other areas subjected to slow moving traffic and pedestrians: Product used must be stiff enough at hot summer temperatures to resist pick up and should not be applied on top of the pavement surface. Product should have a high temperature grade at least one step above the LTPPBIND grade for the climate. For even better pick-up resistance, increase by two grades.

Pavement to receive an Overlay, Surface Treatment, or Seal Coat: Product will be subjected to overlay heat effects and carriers for surface treatments and seal coats. If product is applied on top of the pavement, and an overlay is then placed, bumps may occur during compaction. Refer to "Bump Formation & Prevention in Asphalt Concrete Overlays Which Have Been Crack Sealed" (www.crafco.com) for more information. Solvents or other carriers in surface treatments may soften product. Prior to placing a surface treatment or seal coat, a test strip should be placed to verify compatibility of the product and treatment.

High Severity Cracked Areas: Highly cracked areas (fatigue cracks in wheel paths) should not be treated by covering cracks because pavement friction may be affected. These cracks can be filled if followed by a surface treatment or overlay to restore friction.

Fuel or Oil Spill Areas: These products should not be used in fuel or oil spill areas due to softening of the sealant that may occur. Sealant will not adhere to asphalt or concrete pavements surfaces that are contaminated with oil spills.

Crack Sealing or Filling in Pavements with Surface Treatments: When crack sealing or filling pavements with chip seals, slurry seals, and open graded friction courses, routing should be deep enough to extend through the surface treatment layer into the underlying asphalt concrete. This anchors product into solid pavement for better bonding.

CLEAN OUT: If melters used require clean out, follow manufacturer's instructions. If solvent is used, insure it does not contaminate product because dilution and flash problems may occur.

STORAGE: Pallets of product are protected with a weather resistant covering. During storage, this covering must be intact to prevent boxes from getting wet. If wet, boxes may lose strength and crush. Rips in the pallet covering should be repaired to maintain packaging integrity. Pallets should be stored on a dry, level surface with good drainage. Pallets should not be stacked because crushing of bottom boxes may occur. Product properties are not affected by packaging deterioration.

SAFETY PRECAUTIONS: Since these products are heated to elevated temperatures, it is essential that operations be conducted safely. All personnel need to be aware of hazards of using hot applied materials and safety precautions. Before use, the crew should read and understand product use and safety information on the box and the product MSDS. User should check D.O.T. requirements for transportation of product at elevated temperatures above 212°F (100°C).

HAZARDS ASSOCIATED WITH HOT-APPLIED MATERIALS: Skin contact with hot materials causes burns. Over exposure to fumes may cause respiratory tract irritation, nausea, or headaches. Precautions are to be taken to prevent contact with hot material and to avoid inhalation of fumes for everyone in the vicinity. Safety precautions should include:

1. Protective clothing to prevent skin contact with hot material.
1. Care when adding product to melters to reduce splashing.
3. Careful operation of wands or pour pots that apply product.
4. Traffic and pedestrian control measures which meet or exceed MUTCD requirements to prevent access to work areas while product is in a molten state.
5. Avoidance of material fumes.
6. Proper application configurations with a minimum amount of material excess.
7. Appropriate clean up of excessive applications or product spills.

ADDITIONAL INFORMATION: Additional information regarding these products is available by contacting your distributor or Crafco, Inc. This information includes:

1. Product Data Sheets
2. Material Safety Data Sheet.
3. Safety Manual
4. Sealing Cracks and Joints in Parking and Pedestrian Areas
5. "Bump Formation & Prevention In Asphalt Concrete Overlays Which Have Been Crack Sealed"
6. Sealant Selection Guide

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SUPPLEMENTAL SPECIFICATION 1

Door Hanger

SUP 1.1 DESCRIPTION: Provide door hanger to properties impacted by asphalt overlay and curb ramp construction.

SUP 1.2 MATERIALS: N/A

SUP 1.3 CONSTRUCTION: The City of San Antonio is to provide template/verbiage for the door hangers. Contractor will be responsible for reproduction of door hanger for each project. Contractor shall place hangers with every business and resident within each segment of the project. If the curb ramps and asphalt overlay are completed in different phases (at least 2 weeks apart from each other), the contractor must provide additional door hangers to businesses and residents impacted by the separate construction. The Contractor will not receive additional compensation for handing out multiple notices on a single project.

SUP 1.4 MEASUREMENT: Door Hangers will not be measured per each project; rather, it will be based on a lump sum for all projects as a whole.

SUP 1.5 PAYMENT: Door Hangers shall be paid at the contract unit price per Lump Sum. Payment for additional door hangers required when asphalt overlay and curb ramp construction is separated by two weeks or greater will not be paid for directly, but shall be figured in the Lump Sum cost for door hangers.

BID ITEM:
SUP 1 – Door Hangers – Lump Sum (LS)

SUPPLEMENTAL SPECIFICATION 2

Police Officer

SUP 2.1 DESCRIPTION: Provide uniformed off-duty police officer(s) as directed by the City of San Antonio Project Manager and Traffic Engineer where two-way traffic is to be maintained at major intersections.

SUP 2.2 MATERIALS: N/A

SUP 2.3 CONSTRUCTION: Coordinate with City of San Antonio Construction Inspector to determine the duration and locations where off-duty police officers will be deployed. At project sites that require police officers, contractor will not be allowed to start any form of work until police officer is on-site and directing traffic.

SUP 2.4 MEASUREMENT: Police Officer services will be measured by the hour per officer. Contractor must provide time statements showing documentation of hours worked per officer.

SUP 2.5 PAYMENT: The accepted quantity of man-hours shall be paid at the contract unit price for each hour

BID ITEM:
SUP 2 – Police Officer – per Hour (HR)

SUPPLEMENTAL SPECIFICATION 3

Railroad Insurance and Permit

SUP 3.1 DESCRIPTION: Each Contractor is to include a $5,000 allowance for the SUP 3 RAILROAD INSURANCE AND PERMIT bid item. Contractor to secure all required railroad permits. All fees associated with such permits shall be included in this item.

SUP 3.2 MATERIALS: N/A

SUP 3.3 CONSTRUCTION: N/A.

SUP 3.4 MEASUREMENT: Railroad Insurance and Permit will not be measured per each project; rather, it will be based on a lump sum.

SUP 3.5 PAYMENT: Railroad Insurance and Permit shall be paid at the contract unit price per Lump Sum.

BID ITEM:
SUP 3 – Railroad Insurance and Permit – Lump Sum (LS)

SUPPLEMENTAL SPECIFICATION 4

Laptop and Wireless Internet Access

SUP 4.1 DESCRIPTION: This item shall govern the furnishing of a laptop with wireless internet access to be used by the inspection force for the duration of the contract.

SUP 4.2 EQUIPMENT:

A. **General.** Furnish facilities after the receipt of the work order to begin work and before beginning physical work on the project. Provide laptop and wireless internet access to inspection supervisor and he/she will distribute to the inspector assigned to this contract.
B. **Damage.** Immediately repair or replace the laptop if it is damaged in any manner. Payment for repair will not be made unless it is the result of negligence by the City.
C. **Appurtenances.**
    a. Laptop computers shall meet the following operating system:
        i. Windows 7
    b. Internet Service. The internet service must be provided in the form of a wireless access card.

SUP 4.3 MATERIALS: N/A

SUP 4.4 CONSTRUCTION: N/A

SUP 4.5 MEASUREMENT: Laptop and Wireless Internet Access will not be measured by each unit; rather, it will be based on a Lump Sum.

SUP 4.6 PAYMENT: Laptop and Wireless Internet Access shall be paid at the contract unit price per Lump Sum. The laptop shall remain the property of the contractor after completion of this contract.

BID ITEM:
SUP 4 – Laptop and Wireless Internet Access – Lump Sum (LS)

SUPPLEMENTAL SPECIFICATION 5

TCI "At Work" Project Sign

SUP 5.1 DESCRIPTION: Purchase & display project sign for the Department of Transportation & Capital Improvements (TCI) for length of construction of individual project.

SUP 5.2 MATERIALS: Contractor to furnish materials necessary to display the "At Work" project sign.

SUP 5.3 EQUIPMENT: Provide equipment necessary to conduct the work specified herein or as directed by the Engineer.

SUP 5.4 CONSTRUCTION: TCI project signs shall be installed at the project site prior to construction start. TCI project signs shall remain in place until after all construction has been completed. The Project Manager will determine the number of signs needed for each project.

SUP 5.5 MEASUREMENT: TCI "At Work" Project Sign, as prescribed above, will be measured by the unit of each project sign purchased and utilized. The storage and transfer of sign from project to project, as well as the equipment & material required to mount the sign, will not be measured for payment.

SUP 5.6 PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per project sign for TCI "At Work" Project Sign which price shall be full compensation for sign purchase, equipment & materials required to mount each sign, storage and transfer of each sign from project to project; for furnishing and placing all materials and for all labor, tools, equipment and incidentals necessary to complete the work

BID ITEM:
SUP 5 – TCI "At Work" Project Sign – per Each (EA)

SUPPLEMENTAL SPECIFICATION 6

Portable Changeable Message Sign (PCMS)
(Electronic Message Board)

SUP 6.1 DESCRIPTION: Provide portable changeable message signs to notify the general public of construction activities for upcoming and ongoing projects.

SUP 6.2 MATERIALS: N/A.

SUP 6.3 EQUIPMENT: Provide equipment necessary to conduct the work specified herein or as directed by the Engineer.

SUP 6.4 CONSTRUCTION: Perform all work in conformance with this section unless otherwise shown on the plans. Provide portable changeable message signs as directed by Project Manager or Engineer. Text for message boards will be provided by Project Manager or Engineer. Project locations will be determined by the Engineer of Project Manager. Contractor must be able to provide portable changeable message signs for the duration of specified projects throughout the duration of the contract. Contractor must also have one (1) portable changeable message sign on standby in the event one of the message boards in use breaks down.

SUP 6.5 MEASUREMENT: Portable Changeable Message Signs, as prescribed above, will be measured on a monthly basis. The equipment required to store, relocate and transport the message boards will not be measured for payment. Adjusting messages will also not be measured for payment. The standby portable changeable message sign will not be measured for payment.

SUP 6.6 PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per month for "Portable Changeable Message Signs" which price shall be full compensation for all storage, transportation, set up and maintenance; for furnishing and placing all materials and for all labor, tools, equipment and incidentals necessary to complete the work.

BID ITEM:
SUP 6 – Portable Changeable Message Sign (Electronic Message Board) – per Month (MO)

SUPPLEMENTAL SPECIFICATION 7

Additional Mobilization

The City will pay mobilization accordingly for the following situations:

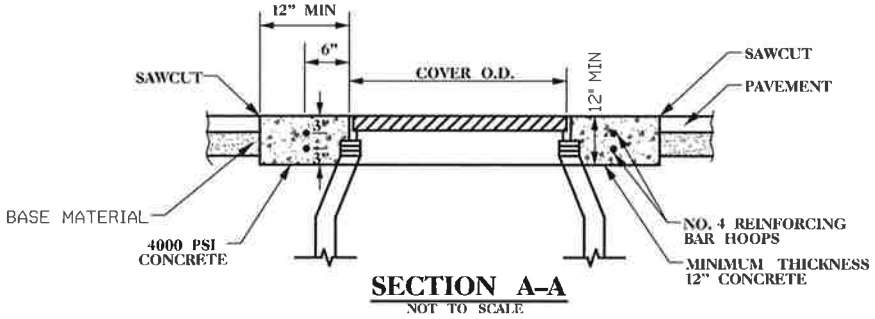
1. For special request projects where the Project Manager requires immediate mobilization (within a 24 to 48-hour period) by the Contractor.
2. For instances where the contractor has mobilized equipment to a specific site, then is asked by the City to relocate equipment to a new project without performing any work on the original project.

BID ITEM:
SUP 7 – Mobilization – per Each (EA)

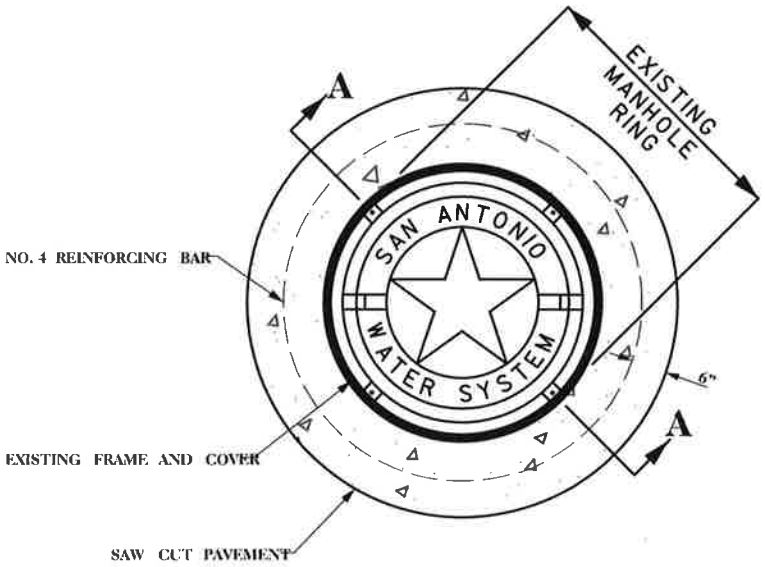
The City will not pay additional mobilization for the following situations. The situations below are considered subsidiary and should be figured into the bid through various other bid items.

1. Mobilization for projects not considered special requests or when the contractor is not redirected as outlined above will not be paid, no matter what the total project cost is.
2. Some projects shall have working time restrictions due to school zones and other factors that may impact a project. The contractor will not be paid extra for projects that have working time restrictions. The extra time on a project required due to a project with time restrictions shall be included in various other bid items.
3. It is expected that projects under this contract will require night and weekend work. The contractor will not be paid extra for projects that require night and weekend work and shall include that cost in various other bid items.

IMP Transportation and Capital Improvements sign specs.



SECTION A–A
NOT TO SCALE



PLAN
NOT TO SCALE

NOTE:

1. CONCRETE SHALL BE 4000 PSI, MIN., AND REINFORCED WITH NO. 4 BARS, AS SHOWN.
2. THE CONCRETE SHALL EXTEND TO THE EDGE OF SAWCUT PAVEMENT.
3. MANHOLE RING ENCASEMENT IS REQUIRED ON ALL NEW, EXISTING, OR ADJUSTED MANHOLES.

STATE OF TEXAS
STEPHEN J. ANIOL
112658
LICENSED
PROFESSIONAL ENGINEER

12/8/16

Lockwood, Andrews & Newnam, Inc.
A LEO A. DALY COMPANY

TBPE REGISTRATION NO. F-2614

CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS

COSA TASK ORDER CONTRACT
MANHOLE ADJUSTMENTS

MANHOLE CONCRETE ADJUSTMENT DETAIL

% SUBMITTAL	PROJECT NO.:		DATE: SEP 2016
DRAWN BY:	DSGN BY:	CHKD. BY:	SHT. 1 OF 1

Plotted on: $DATE$ $TIME$

Design Filename: $FILE$

CITY GENERAL NOTES FOR ASPHALT OVERLAY PROJECTS

1. ALL CONSTRUCTION SHALL CONFORM TO THE STANDARD SPECIFICATIONS, SPECIAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS, AND SPECIAL PROVISIONS LISTED IN THE GOVERNING SPECIFICATIONS MANUAL OF THE CONTRACT DOCUMENTS.

2. THE CONTRACTOR SHALL PROVIDE ACCESS FOR RESIDENTS, BUSINESSES, AND OR THE DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE AT ALL TIMES. THE CONTRACTOR SHALL COORDINATE WITH THE INSPECTOR FOR SOLID WASTE COLLECTION.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO THE ORIGINAL OR BETTER CONDITION FOR ANY DAMAGE DONE TO EXISTING FENCES, CONCRETE ISLANDS, STREET PAVING, CURBS, SHRUBS, BUSHES, DRIVEWAYS, OR ANY OTHER EXISTING ITEM. (NO SEPARATE PAY ITEM).

4. THE CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKS, ETC. IF ANY ARE DESTROYED OR REMOVED BY THE CONTRACTOR OR HIS EMPLOYEES, THEY SHALL BE REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

5. DO NOT PLACE ANY WASTE MATERIAL IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT. ALL WASTE MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND IT SHALL BE HIS SOLE RESPONSIBILITY TO DISPOSE OF THESE MATERIALS OFF THE LIMITS OF THE PROJECT AND RIGHT-OF-WAY. NO WASTE MATERIALS SHALL BE PLACED IN DESIGNATED FLOOD PLAINS OR IN LOW AREAS THAT WILL BLOCK OR ALTER FLOW OF EXISTING NATURAL OR ENGINEERED DRAINAGE.

6. IF THE CONTRACTOR ENCOUNTERS ANY ARCHAEOLOGICAL DEPOSITS DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR MUST STOP EXCAVATION IMMEDIATELY, CONTACT THE CITY INSPECTOR, AND CALL THE CITY HISTORIC PRESERVTION OFFICE AT 207-7306 FOR AN ARCHAEOLOGICAL INVESTIGATION. THE CONTRACTOR CANNOT BEGIN EXCAVATION AGAIN WITHOUT WRITTEN PERMISSION FROM THE CITY.

   IF MORE THAN THREE (3) DAYS ARE REQUIRED FOR INVESTIGATION (NOT INCLUDING HOLIDAY AND WEEKENDS) AND IF THE CONTRACTOR IS UNABLE TO WORK IN OTHER AREAS, THEN THE CONTRACTOR WILL BE ALLOWED TO NEGOTIATE FOR ADDITIONAL CONSTRUCTION TIME UPON WRITTEN REQUEST WITHIN TEN (10) DAYS AFTER THE FIRST NOTICE TO THE CITY ARCHAEOLOGICAL INVESTIGATION FOR EACH EVENT.

   IF THE TIME REQUIRED FOR INVESTIGATION IS LESS THAN OR EQUAL TO THREE (3) DAYS FOR EACH EVENT, CONTRACT DURATION WILL NOT BE EXTENDED.

7. PROJECT LOCATIONS AND LIMITS MAY HAVE BEEN IDENTIFIED IN THE PLANS. HOWEVER, ADDITIONS, DELETIONS, AND MODIFICATIONS TO THE LOCATIONS AND LIMITS MAY OCCUR.

8. AS DIRECTED BY THE ENGINEER, THE STREET PAVEMENT, ADJACENT DRIVEWAYS, SIDEWALKS, AND WALKWAYS SHALL BE SWEPT AND ALL DEBRIS REMOVED FROM THE WORK AREA:

   SUBSEQUENT TO MILLING OPERATIONS,
   PRIOR TO LAYING A SURFACE COURSE,
   AS OFTEN AS NECESSARY TO REMOVE LOOSE MATERIAL,
   AND AT THE END OF EACH WORKDAY.

9. THE CONTRACTOR SHALL PROVIDE THE CITY AN EMERGENCY TELEPHONE NUMBER FOR EVENINGS, WEEKENDS AND HOLIDAYS BY THE FIRST WORKING DAY FOR THE PROJECT. THIS TELEPHONE NUMBER MUST BE A COMMERCIAL ANSWERING SERVICE. THE ANSWERING SERVICE MUST BE ABLE TO CONTACT THE CONTRACTOR AND HAVE THE CONTRACTOR RESPOND TO THE CITY STAFF WITHIN TWO (2) HOURS OF THE INITIAL CONTACT.

10. IF THE CONTRACTOR WISHES TO WORK WEEKENDS, HE SHALL SUBMIT A REQUEST TO THE ENGINEER AND CITY INSPECTOR FOR APPROVAL SEVENTY TWO (72) HOURS PRIOR TO WORKING THE WEEKEND THEY WISH TO WORK. NO ADDITIONAL PAYMENT WILL BE MADE FOR WEEKEND WORK.

11. WHEN PERFORMING WORK OPERATIONS AT NIGHT, THE CONTRACTOR SHALL PROVIDE ADEQUATE LIGHTING TO PEFORM THE NECESSARY OPERATIONS. IN ADDITION, ALL VEHICLES MUST BE EQUIPPED WITH ONE OR MORE HIGH INTENSITY YELLOW FLASHING LIGHTS. (NO SEPARATE PAY ITEM).

12. UPON COMPLETION OF ALL WORK PROVIDED FOR IN THE CONTRACT FOR ANY INDIVIDUAL STREET, THE ENGINEER WILL MAKE AN INSPECTION, AND, IF THE WORK IS FOUND TO BE SATISFACTORY, THE CONTRACTOR WILL BE RELEASED FROM FURTHER MAINTENANCE OF THAT STREET AND WILL BE CONSIDERED A "PARTIAL ACCEPTANCE" OF THE WORK. SAID ACCEPTANCE WILL BE MADE IN WRITING AND SHALL IN NO WAY VOID OR ALTER ANY TERMS OF THE CONTRACT.

13. THE CONTRACTOR AND SUB-CONTRACTOR SHALL NOTIFY THE CITY INSPECTOR AND Q.A. DEPARTMENT TWENTY FOUR (24) HOURS IN ADVANCE OF EACH DAY'S WORK. THIS NOTIFICATION SHALL INCLUDE THE MATERIAL SOURCE LOCATION AND THE LOCATION AT WHICH THE MATERIAL WILL BE PLACED. PHONE NUMBERS WILL BE PROVIDED AT THE PRECONSTRUCTION MEETING.

14. ALL COST ASSOCIATED WITH THE FOLLOWING ITEMS SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS, AND SHALL NOT BE SEPARATELY COMPENSATED:

    100.1 "MOBILIZATION"
    100.2 "INSURANCE AND BOND"
    101.1 "PREPARING RIGHT OF WAY"
    530.1 "BARRICADES, SIGNS & TRAFFIC HANDLING"
    540 "TEMPORARY EROSION, SEDIMENTATION, AND WATER POLLUTION PREVENTION AND CONTROL"

15. PROVIDE NEXT CONSTRUCTION SCHEDULE EVERY FRIDAY BY CLOSE OF BUSINESS, VIA E-MAIL FOR THE DURATION OF THE CONTRACT USING SMP TEMPLATE. THE CITY RESERVES THE RIGHT TO DIRECT THE CONTRACTOR WHERE TO WORK WHEN NECESSARY.

16. PLAN QUANTITIES ARE FOR ESTIMATING PURPOSES ONLY AND SUBJECT TO CHANGE PENDING APPROVAL OF THE ENGINEER.

17. THE CONTRACTOR IS RESPONSIBLE FOR OBEYING ALL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.

18. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING CITY RIGHT OF WAY PERMITS FOR CONSTRUCTION. CONTRACTOR SHALL SUBMIT APPROVED PERMIT TO INSPECTIONS AND PM TEAM. ALL RIGHT OF WAY PERMIT FEES RELATED TO THIS PROJECT WILL BE WAIVED.

19. THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS IN A MANNER SUCH THAT TRUCKS AND OTHER VEHICLES DO NOT CREATE A DIRT NUISANCE OR SAFETY HAZARD IN ANY STREETS, PUBLIC OR PRIVATE. CLEAN UP OF STREETS SHALL BE DONE DAILY AT A MINUMUM.

20. CONSTRUCTION ON MORE THAN ONE STREET AT A TIME WILL NOT BE PERMITTED IF SATISFACTORY CONFORMANCE TO PLANS AND SPECIFICATIONS ARE NOT MAINTAINED.

21. THE CONTRACTOR IS MADE AWARE THAT THE BID QUANTITIES SHOWN IN THE BID PROPOSAL ARE APPROXIMATE AND MAY CHANGE. THE CITY RESERVES THE RIGHT TO MAKE ADJUSTMENTS IN THE FIELD. PAYMENT FOR PERFORMING THE WORK SHALL BE MADE AT THE ESTABLISHED BID UNIT PRICE IN THE CONTRACT.

22. THE CITY WILL PROVIDE A TEMPLATE/VERBAGE FOR THE DOOR HANGER. CONTRACTOR SHALL PLACE HANGERS ON EVERY BUSINESS OR RESIDENCE WITHIN EACH SEGMENT LIMITS AND ANY OTHER LOCATIONS AS SPECIFIED BY THE INSPECTOR. AN ADDITIONAL DOOR HANGER SHALL BE PLACED AT ALL CORNER LOTS THAT WILL BE RECEIVING CURB RAMPS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE A REVIEW COPY OF THE DOOR HANGER TO THE CITY SEVEN (7) DAYS PRIOR TO DISTRIBUTION. PAY ITEM SUP 1 DOOR HANGERS.

23. INCLUDE A MAILBOX POST BLOCKOUT FOR VACANT LOTS AND ALL RESIDENCES WHICH DO NOT HAVE MAILBOXES AT THE CURB. BLOCKOUTS ARE PROVIDED FOR FUTURE USE BY THE POST OFFICE.

24. THE CONTRACTOR SHALL NOT MILL OR OVERLAY A STREET BEYOND THE LONGITUDINAL LIMITS OF WHICH HE CANNOT MILL OR OVERLAY FOR ITS FULL WIDTH THAT SAME DAY UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

25. THE CONTRACTOR SHALL APPLY FINAL ASPHALT NO LATER THAN FOURTEEN (14) DAYS AFTER MILLING OR BASE REPAIRS. SHOULD EXISTING BASE MATERIALS BECOME EXPOSED DUE TO MILLING, THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE EXISTING COMPACTED BASE UNTIL WHICH TIME IT CAN BE OVERLAID (WITHIN 14 DAYS MAX). EXPOSED BASE SHALL BE ROLLED AND PRIME COATED AS DIRECTED BY THE ENGINEER (NO SEPARATE PAY ITEM).

26. AS DIRECTED BY THE ENGINEER, "FEATHER" H.M.A.C. INTO DRIVEWAYS TO PREVENT SURFACE PONDING (NO SEPARATE PAY ITEM)

27. ALL AGGREGATE FOR SEAL COAT SHALL BE DELIVERED TO THE JOB SITE AT ATMOSPHERIC TEMPERATURES AND SHALL BE ADEQUATELY DRIED TO THE SATISFACTION OF THE ENGINEER.

    SEAL COAT MATERIAL DATA:

ASPHALT-TYPE/GRADE	BINDER OIL: AC5 OR AC10
ASPHALT-RATE	0. 28 - 0.32 GAL/SY
AGGREGATE-TYPE/GRADE	CRUSHED LIMESTONE, GRADE 4. TYPE B NON-PRECOAT
AGGREGATE-RATE	18-20 LBS/SY

    IT IS THE INTENT THAT ASPHALT CEMENT BINDER OIL BE USED FOR ALL SEAL COATING; HOWEVER, IF WEATHER CONDITIONS ARE NOT CONDUCIVE FOR ITS APPLICATION, THEN AN EMULSION MAY BE USED AT NO EXTRA PAY.

28. THE PERCENT WEAR OF THE SEAL COAT AGGREGATE (TEST METHOD TEX-410-A) SHALL NOT EXCEED 25%.

29. THE CONTRACTOR SHALL MAINTAIN SEAL COAT. (NO SEPARATE PAY ITEM)

30. OVERLAYING OF STREET SURFACES MAY COMMENCE AFTER AN ACCEPTABLE APPLICATION OF SEAL COAT HAS BEEN APPLIED AS DETERMINED BY THE ENGINEER.

31. COARSE AGGREGATE SHALL BE CLASS (A) ROCK FOR BID ITEM 340, AND CLASS (B) ROCK FOR BID ITEM 205.

32. ALL CONCRETE SURFACES AND CONSTRUCTION JOINTS THAT WILL CONTACT THE PROPOSED H.M.A.C. SHALL BE PAINTED WITH A THIN UNIFORM COAT OF SS-1H TACK COAT. TACK COAT SHALL MEET THE REQUIREMENTS OF ITEM 203 AND SHALL BE AT NO DIRECT PAY.

STATE OF TEXAS
STEPHEN J. ANIOL
112658
LICENSED
PROFESSIONAL ENGINEER
12/8/16

NO.	REVISION	DRAWN	APPROVED	DATE

Lockwood, Andrews & Newnam, Inc.
A LEO A. DALY COMPANY
TBPE REGISTRATION NO. F-2614

CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

FY 2017 ASPHALT OVERLAY
TASK ORDER PACKAGE 5
GENERAL NOTES

SHEET 1 OF 5

DRAWN BY:	PROJECT NO.: 120-11729-020	DATE: DEC-2016
	DSGN. BY: / CHKD. BY:	SHEET NO.:

Plotted on: $DATE$ $TIME$

CITY GENERAL NOTES FOR ASPHALT OVERLAY PROJECTS (CONTINUED)

33. AT INTERSECTIONS WITH SIDEWALKS, THE FOLLOWING GUIDELINES WILL BE USED FOR THE PLACEMENT OF CURB RAMPS:

    ALL CURB RAMPS SHALL HAVE TRUNCATED DOMES INSTALLED.

    DESIGN DECISIONS ON CURB RAMPS WILL BE MADE IN THE FIELD WITH THE ENGINEER/CITY INSPECTOR.

    TYPE 1 (1) AND TYPE III (3) SHALL BE PAID AS TWO (2) EACH ITEM 502.1A

    TYPE II, IV, & V (2, 4 & 5) SHALL BE PAID AS ONE (1) EACH ITEM 502.1 A

    EACH CURB RAMP SHALL INCLUDE THE LANDING PLUS WINGS UP TO TWENTY-FOUR (24) FEET TOTAL LENGTH.

    THE BID PRICE FOR THE CURB RAMPS SHALL INCLUDE ALL NECESSARY SUBSIDIARY WORK TO CONSTRUCT AND COMPLETE THE FOLLOWING;

    -SIDEWALK AND CURB DEMOLITION AND REMOVAL.

    -CURB RAMP LANDINGS AND WINGS UP TO 13 SY IN AREA. WHEN CURB RAMP LANDINGS PLUS WINGS TOTAL AREA EXCEEDS 13 SY, ANY ADDITIONAL AREA OF WINGS REQUIRED TO ACHIEVE MINIMUM SLOPE SHALL BE PAID AS SIDEWALK ITEM 502.

    -DETECTABLE ADA APPROVED WARNINGS, SHALL BE CAST IN PLACE 24"X 60" MANUFACTURED BY ARMOR TILE MODEL NUMBER 465C2460RD UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

    -NEW CURB INSTALLATION UP TO 24 LF. ANY ADDITIONAL CURB LENGTH OVER 24 FEET SHALL BE PAID AS CURB ITEM 500.

    -CONCRETE RETAINING WALL UP TO 6" HIGH AS NECESSARY. RETAINING WALLS EXCEEDING 6" IN HEIGHT WILL BE PAID AS SIDEWALK.

    -SIGN ADJUSTMENT.

    -IRRIGATION RELOCATION AS NECESSARY.

    -LANDSCAPE RELOCATION AS NECESSARY.

34. SOME STREETS MAY HAVE EXISTING SPEED HUMPS. ALL EXISTING SPEED HUMPS SHALL BE REPLACED IN ACCORDANCE WITH THE DETAILS IN THE PLANS.

35. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL USE 64-22 or 76-22 ASPHALT MIX IN PROJECTS AS NOTED IN REVISED SPECIFICATIONS 205.

36. USE VACUUM OR REGENERATIVE AIR SWEEPERS ONLY WHEN SWEEPING WORK AREA.

37. ALL ASPHALT CUTTINGS AND AGGREGATE SHALL BE CONFINED TO THE STREET SURFACE WHERE THEY SHALL BE SWEPT UP AND REMOVED FROM THE RIGHT-OF-WAY BY THE END OF EACH WORK DAY.

38. ALL BASE FAILURE REPLACEMENTS SHALL BE MARKED AND APPROVED BY THE ENGINEER OR PROJECT MANAGER.

39. PAVEMENT CUTS SHALL BE PERFORMED BY EQUIPMENT APPROVED BY THE ENGINEER OR PROJECT MANAGER. IT SHALL NOT PRESENT A HAZARD TO TRAFFIC. ALL SAW CUTS SHALL BE FULL DEPTH SAWCUTS.

40. THE DEPTH OF PAVEMENT FOR ITEM 230 (REPLACING BASE AND PAVEMENT) SHALL BE TO THE SPECIFIED DEPTH UNLESS DIRECTED OTHERWISE BY THE ENGINEER. PRIOR TO EXCAVATION, DESIGNATED BASE FAILURES SHALL BE CUT VERTICALLY FOR THE FULL DEPTH SPECIFIED WITH A ROCK SAW OR OTHER APPROVED EQUALLY CAPABLE EQUIPMENT. THE EDGES OF THE EXISTING ASPHALT WHICH ARE CUT BY THE ROCK SAW MUST BE VERTICAL, STRAIGHT, AND UNIFORM TO ENSURE THAT THE NEW ASPHALT ABUTS TO A SOLID, CLEAN VERTICAL SURFACE. PLACE TYPE B HMAP IN FIVE (5) INCH MAXIMUM LIFTS AND COMPACT EACH LIFT AND DOCUMENT THE DENSITY READING. TOP MAT REQUIRES APPROVAL/ACCEPTANCE OF THE ENGINEER.

41. DELIVER TRUCK TICKETS TO THE INSPECTOR FOR ALL HOT MIX ASPHALTIC PAVEMENT INCLUDING (TYPE B COARSE BASE) USED AS BASE MATERIAL. ALL TRUCK TICKETS SHALL HAVE THE NAME OF THE STREET THE MATERIAL WAS PLACED ON. THE YIELD FOR THE STREET WILL BE COMPUTED BY CONVERTING TONNAGE FOR THAT STREET TO SY AT THE RATE OF 110 LBS/SY PER INCH OF DEPTH. THE COMPUTATION THE YIELD WILL BE USED BY THE INSPECTOR TO CHECK THAT THE BASE REPAIR WAS COMPLETED TO THE SPECIFIED DEPTH FOR PAYMENT.

42. ALL DAILY BASE REPLACEMENTS SHALL BE PROPERLY EXCAVATED, BARRICADED, AND OPEN TO TRAFFIC THE SAME DAY. DO NOT EXCAVATE FOR BASE REPAIRS IF THE WORK CANNOT BE COMPLETED THAT DAY.

43. PLACE FLEXIBLE BASE AS DIRECTED BY THE ENGINEER WHERE BASE FAILURE EXCAVATION NECESSITATES EXCEEDING THE SPECIFIED DEPTH FOR ITEM 230 (REPLACING BASE AND PAVEMENT). (NO SEPARATE PAY ITEM)

44. TYPE B HMAP "BASE AND PAVEMENT" MIXTURES SHALL BE AT A TEMPERATURE BETWEEN 225°F AND 350°F WHEN PLACED IN EXCAVATED CUTS. WHEN THE ASPHALT TEMPERATURES FALL BELOW 225°F, THE ASPHALT MUST BE DISCARDED AND PAYMENT WILL NOT BE MADE FOR THE DISCARDED MATERIAL. IF INSULATED TRUCKS ARE REQUIRED TO MAINTAIN TEMPERATURES, NO ADDITIONAL PAYMENT WILL BE MADE TO THE CONTRACTOR.

45. FOR STREETS WITHOUT CURB AND GUTTER, THE CONTRACTOR SHALL INSTALL SHOULDER BACKING PER "SHOULDER BACKING DETAIL" PROVIDED ON THE ASPHALT OVERLAY DETAIL SHEET. (NO SEPARATE PAY ITEM)

46. MILLING OF ASPHALTIC PAVEMENT SHALL BE PERFORMED THROUGHOUT TURNOUTS AND CUL DE SACS WHICH ARE ADJACENT TO STREETS WHICH HAVE BEEN IDENTIFIED IN THE PLANS TO BE MILLED.

47. ACTUAL DEPTHS OF MILLING ALONG CURB LINES AND ON BRIDGE DECKS SHALL BE AS DIRECTED BY THE ENGINEER. CONCRETE BRIDGE DECKS SHALL NOT BE MILLED. NO BUTT JOINTS ARE ALLOWED.

48. EACH STREET SHALL BE SEAL COATED IN ITS ENTIRETY, INCLUDING ADJACENT TURNOUTS AND CUL DE SACS, UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

49. THE MINIMUM RATE OF TYPE "C & D" H.M.A.C. THAT WILL BE ACCEPTED IS 220 LBS/SY. IN THE EVENT THE AVERAGE RATE OF TYPE "C & D" H.M.A.C.FALLS BELOW 220 LBS./SY, THE CONTRACTOR WILL BE REQUIRED TO REMOVE THE ENTIRE PAVED AREA AND REPLACE AT HIS OWN EXPENSE. THE ENGINEER WILL DETERMINE THE THICKNESS OF TYPE H.M.A.C. NEEDED FOR EACH PROJECT. ACCEPTABLE ASPHALT RANGES & PAYMENT INFORMATION CAN BE FOUND IN SPECIAL PROVISION ITEM 205 HOT MIX ASPHALTIC CONCRETE PAVEMENT AND SPECIAL PROVISION ITEM 230 BASE & PAVEMENT REPLACEMENT. A LEVEL UP H.M.A.C. COURSE MATERIAL MAY ALSO BE REQUIRED TO BE PLACED ON STREETS AT LOCATIONS AND DEPTHS AS DIRECTED BY THE ENGINEER TO REMOVE LOW SPOTS. THIS WORK WILL BE PAID BY THE TON UNDER ITEM 205.

50. ALL QUANTITIES SHALL BE PRE-APPROVED BY THE ENGINEER.

51. CARE SHOULD BE TAKEN TO PREVENT MILLING FROM ENTERING INLETS AND STORM SEWERS. ALL MATERIAL ENTERING INLETS AND STORM SEWERS SHALL BE REMOVED BY THE CONTRACTOR AT NO ADDITIONAL COST.

52. WHEN THE CONTRACTOR PLACES A STOCKPILE OF HMAC MATERIAL ON SITE, THE MATERIAL SHALL BE USED PRIOR 'TO THE END OF' THE WORK DAY. IF THE MATERIAL IS NOT USED, IT SHALL NOT BE US ED ON ANY STREET.

53. CONTRACTOR SHALL FURNISH ALL TRUCK TICKETS FOR ASPHALT AS PROVIDED BY THE MATERIAL SUPPLIER(S). THE FOLLOWING INFORMATION WILL BE PRINTED ON EACH TICKET BY THE SUPPLIER; DATE, TIME, AMOUNT (IN TONS), AND STREET NAME WHERE THE MATERIALS WILL BE USED. EACH TICKET MUST BE SUBMITTED TO CITY OFFICIALS NO LATER THAN 24 HOURS AFTER PLACEMENT OF ASPHALT.

54. WHEN A RUBBER ADDITIVE IS REQUIRED, THE ASPHALT BINDER SHALL MEET THE REQUIREMENTS OF PG 64-22 or 76-22 G. T.R 10 AS SPECIFIED IN THE SPECIAL PROVISIONS OF THE SPECIFICATIONS.

55. THE CONTRACTOR SHALL VIDEO TAPE ALL PROJECTS PRIOR TO ANY CONSTRUCTION. A BACK UP COPY WILL BE SUMITTED TO THE CITY OF SAN ANTONIO PAVEMENT ENGINEERING DIVISION 48 HOURS BEFORE PROJECTS COMMENCE. ITEMS TO BE VIDEOTAPED NEED TO BE IDENTIFIED BY ADDRESS;

    FENCES
    MAILBOX FROM ALL SIDES
    DRIVEWAY ENTRIES
    CURBS, SIDEWALK, AND PEDESTRIAN WALKWAYS
    ANY FORM OF LANDSCAPING ON RIGHT-OF-WAY (TREES, PLANTS, ETC.)

56. THE CONTRACTOR SHALL PROVIDE A PROJECT DELIVERY SCHEDULE AND SEQUENCE OF WORK WITHIN FOURTEEN (14) DAYS MAXIMUM OF BEING ISSUED THE NOTICE TO PROCEED FOR APPROVAL FROM THE CITY. THE CITY RESERVES THE RIGHT TO MAKE SPECIAL REQUESTS FOR PROJECT SCHEDULE AND COMPLETION AT NO ADDITIONAL COST TO THE CITY. THE CONTRACTOR SHALL NOT SCHEDULE MORE THAN ONE WEEK GAP IN THE WORK IN THE BASE SCHEDULE.

57. THE CONTRACTOR SHALL UTILIZE AND MAINTAIN ITEM 1000-WEB PORTAL AT A MINIMUM OF ONCE A MONTH. PAYMENT IS SUBSIDARY TO OTHER ITEMS.

58. NO ADDITIONAL PAYMENT WILL BE MADE TO THE CONTRACTOR FOR NIGHT OR WEEKEND WORK.

59. WHEN DIRECTED BY THE ENGINEER, FOG SEAL (TRMSS) SHALL BE APPLIED AT A RATE OF 0.08 TO 0.15 GAL/SY.

60. THE CONTRACTOR SHALL NOT CEASE WORK ON A CONTRACT FOR MORE THAN FOURTEEN (14) DAYS WITHOUT COMPLETION OF MAJOR WORK. MAJOR WORK CONSTITUES AS MILLING, BASE/PAVEMENT REPAIR, SEAL COAT, FINAL SURFACE MAT, ETC.

61. THE CITY SHALL PROVIDE PAYMENT FOR SAWS/CPS ENERGY ITEMS AFTER WORK HAS BEEN COMPLETED PROVIDED PROPER DOCUMENTATION IS ATTACHED WITH THE INVOICE.

62. ALL WORK, INCLUDING UTILITY ADJUSTMENTS, STRIPING, FLATWORK, ETC. SHALL BE COMPLETED WITHIN CONTRACT TIME.

63. CONTRACTOR SHALL REFER TO SECTION 4.3.6 CLAIMS FOR ADDITIONAL TIME OF THE GENERAL CONDITIONS FOR INCLEMENT WEATHER DAYS.

64. FOR TASK ORDER CONTRACTS, TASK ORDERS CAN BE DISTRIBUTED AT THE CITY'S DISCRETION OVER THE ENTIRE LENGTH OF THE CONTRACT.

65. RECYCLED ASPHALT SHINGLES (RAS) WILL NOT BE ALLOWED IN THE SURFACE MIXES (TYPE C & D)

66. REQUIRED PERFORMANCE GRADE (PG) ASPHALT MIXES CAN BE ACHIEVED WITH MODIFIERS. A MAXIMUM OF ONE (1) GRADE INCREASE WITH MODIFIERS WILL BE ALLOWED TO ACHIEVE REQUIRED PERFORMANCE GRADE (PG).

67. REFER TO SPECIFICATION 205 "HOT MIX ASPHALTIC CONCRETE PAVEMENT" FOR INFORMATION ON HAMBURG WHEEL TEST REQUIREMENTS. AT THE ENGINEER'S OR PROJECT MANAGER'S DISCRETION, HAMBURG WHEEL TESTS WILL BE CONDUCTED TO ENSURE PRODUCT MEETS SPECIFICATION.

STATE OF TEXAS
STEPHEN J. ANIOL
112658
LICENSED
PROFESSIONAL ENGINEER
12/8/16

NO.	REVISION	DRAWN	APPROVED	DATE

Lockwood, Andrews & Newnam, Inc.
A LEO A. DALY COMPANY
TBPE REGISTRATION NO. F-2614

CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

FY 2017 ASPHALT OVERLAY
TASK ORDER PACKAGE 5
GENERAL NOTES

SHEET 2 OF 5

DRAWN BY:	DSGN. BY:	CHKD. BY:	PROJECT NO.: 120-11729-020	DATE: DEC-2016	SHEET NO.:

Design Filename: $FILE$

Plotted on: $DATE$ $TIME$

Design Filename: $FILE$

UTILITY GENERAL NOTES

1. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.181. THIS REQUIRES THAT C.P.S. MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES AT NO DIRECT PAY. THE CONTRACTOR MUST WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
2. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO EXCAVATION TO DETERMINE THE LOCATION OF EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY THE FOLLOWING AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO EXCAVATION OPERATION.

   SAN ANTONIO WATER SYSTEM 233-2010/2009
   COSA DRAINAGE 207-8048
   COSA SIGNAL OPERATIONS 207-7720
   TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005
   -CITY PUBLIC SERVICE
   -TIME WARNER
   -SOUTHWESTERN BELL TELEPHONE
   -SBC
   -AT&T
   -MCI
3. THE CONTRACTOR SHALL PROTECT TELEPHONE COMPANY EQUIPMENT AND OPERATIONS DURING CONSTRUCTION.
4. CONTRACTOR SHALL INVESTIGATE AND VERIFY ALL UTILITIES BEFORE STARTING WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR THE MAINTANCE OF THE EXISTING UTILITIES. LOCATION AND DEPTH OF UTILITIES SHOWN BY LOCATES HERE ARE APPROX IMATE ONLY. ACTUAL LOCATIONS AND DEPTHS MUST BE VERIFIED PRIOR TO CONSTRUCTION AND THE CONTRACTOR SHALL BE RESPONSIBLE OR THE PROTECTION OF THE SAME DURING CONSTRUCTION.
5. ALL AT&T MANHOLE ADJUSTMENTS WILL BE PAID FOR UNDER ITEM 512.1B. ALL MATERIALS INCLUDING RING RISERS SHALL BE PROVIDED BY AT&T.
6. IF ANY WORK IS REQUIRED WITHIN THE RAILROAD RIGHT-OF-WAY, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE REQUIRED INSURANCE. (LUMP SUM) PAY ITEM: SUP 3 RAILROAD INSURANCE PERMIT.
7. ALL MANHOLES AND OTHER UTILITY STRUCTURES IN THE CONSTRUCTION AREA SHALL BE ADJUSTED TO THE FINISHED GRADE. THIS ADJUSTMENT SHALL BE COMPLETED WITHIN 48 HOURS AFTER PLACEMENT OF ASPHALT. ALL PAY ITEMS INCLUDED IN BID PROPOSAL SHALL BE ADJUSTED WITHIN 48 HOURS.
8. BUILDING PAPER SHALL BE PLACED OVER ALL MANHOLES, VALVE BOXES, GRATES, ETC., SO AS TO PROTECT THE SURFACES FROM ASPHALTIC MATERIALS DURING APPLICATION OF SEAL COAT OR TACK COAT. ASPHALT MATERIALS SHALL NOT BE PLACED, LAPPED, OR SPLASHED ONTO ADJACENT STRUCTURES OR SURFACES. FOR STREETS THAT RECEIVE A FULL MILL APPLICATION, STREET SURFACES ADJACENT TO MANHOLES, WATER/GAS VALVES, DRAIN GATES, BRIDGE JOINTS, CURBS, ETC., SHALL BE COMPLETELY MILLED TO DEPTH AS SPECIFIED FOR THE STREET UNLESS OTHERWISE DIRECTED BY THE ENGINEER. ALL MANHOLES AND VALVES SHALL BE ADJUSTED SO THAT THE RING AND COVER ARE WITHIN ½" MAXIMUM OF THE FINISHED GRADE OF THE NEW PAVEMENT. A SINGLE PAYMENT AT THE CONTRACTOR'S UNIT BID PRICE SHALL BE MADE FOR EACH MANHOLE ADJUSTED TO THE FINISHED GRADE OF NEW PAVEMENT. ALL UTILITY ADJUSTMENTS SHALL BE PERFORMED WITHIN 48 HOURS OF PAVING. ALL ADJUSTMENTS SHALL CONFORM TO THE "MANHOLE AND VALVE ADJUSTMENT" STANDARD DETAIL INCLUDED IN THE UTILITY EXCAVATION MANUAL GENERAL REQUIREMENTS AND PROCEDURES FOR EXCAVATION IN CITY OF SAN ANTONIO PUBLIC RIGHTS OF WAY, LATEST EDITION. DETAIL IS REVISED TO INSTALL A CIRCULAR CONCRETE COLLAR IN PLACE OF SQUARE CONCRETE COLLAR. CIRCULAR CONCRETE COLLAR TO BE 12-INCHES THICK CENTERED ON MANHOLE WITH FOUR RADIAL ½ -INCH SCORE MARKS. COLLAR DIAMETER TO BE O.D. OF RING PLUS 12". CIRCULAR CONCRETE COLLAR WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 851 AND ITEM 851A. CIRCULAR CONCRETE COLLAR SHALL BE INSTALLED FOR ALL NEW, EXISTING, AND ADJUSTED MANHOLES.
9. PAVEMENT MARKERS AND MARKINGS SHALL BE INSTALLED WITHIN 15 DAYS AFTER PAVING IS COMPLETED.

EROSION CONTROL AND SEDIMENTATION/STORM WATER POLLUTION PREVENTION PLAN GENERAL NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING, IMPLEMENTING AND MAINTAINING A STORM WATER POLLUTION PREVENTION PLAN (SW3P) FOR THE DURATION OF THE CONSTRUCTION AS DESCRIBED IN ITEM NO. 540. COST OF PREPARING SW3P PLAN AND ALL COSTS FOR FURNISHING, IMPLEMENTING AND MAINTAINING ANY ON SITE POLLUTION CONTROL MEASURES REQUIRED BY THE SW3P (EG. SILT FENCING, CONSTRUCTION EXITS, GRAVEL FILTERS, ETC.) SHALL BE AT NO DIRECT PAY.
2. CONTRACTOR WILL BE RESPONSIBLE FOR COMPLETING WITH TCEQ'S TPDES PROGRAM FOR CONTROL OF SILT AND EROSION. CONTRACTOR SHALL PREPARE A SW3P AND SHALL UPDATE THE SW3P AS NECESSARY BASED ON FIELD CONDITIONS.
3. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO ANY CONSTRUCTION ACIVITIES. THE EROSION CONTROL MEASURES SHALL REMAIN IN PLACE AND FUNCTIONAL UNTIL AFTER THE PROPOSED IMPROVEMENTS ARE IN PLACE.
4. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING STREETS AND SIDEWALKS ADJACENT TO THE PROJECT FREE OF MUD AND DEBRIS FROM CONSTRUCTION AT ALL TIMES.
5. SEDIMENT CONTROL DEVICES SHALL BE INSTALLED PRIOR TO ANY EMBANKMENT OR EXCAVATION WORK BEING DONE. WHEN THE PROJECT IS COMPLETE AND THE ENTIRE SITE IS COMPLETELY STABILIZED, THE SEDIMENT CONTROL DEVICES AND ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER. THE CONTRACTOR HAS THE ULTIMATE RESPONSIBILITY FOR THE EFFECTIVE CONTROL OF EROSION AND SEDIMENTATION.
6. THE CONTRACTOR SHALL SEED OR SOD A COMPLETED EMBANKMENT AS SOON AS PRACTICABLE, BUT NO LATER THAN 14 DAYS AFTER AN EMBANKMENT IS COMPLETE. ALL SODDING SHALL BE PAID FOR UNDER ITEM NO. 516.1 "SODDING" AND AT THE SINGLE UNIT PRICE AS BID PER THE CONTRACT.
7. THE SITE SHALL BE REVIEWED WEEKLY AND AFTER ANY MAJOR STORM EVENTS. ADJUSTMENTS AND REPAIRS TO THE EROSION CONTROL DEVICES SHALL BE MADE AS NEEDED.
8. PROVIDE A COPY OF ANY REQUIRED SW3P TO THE CITY PRIOR TO BEGINNING CONSTRUCTION.

TREE PROTECTION AND PRESERVATION NOTES:

1. NO UTILITY OR STREET EXCAVATION WORK SHALL BEGIN IN AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN COMPLETED AND APPROVED.
2. TREE PROTECTION FENCING SHALL BE REQUIRED AND TREE PROTECTION FENCING SHALL BE INSTALLED, MAINTAINED, AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION (NO SEPARATE PAY ITEM).
3. EXPOSED ROOTS SHALL BE COVERED AT THE END OF THE DAY USING TECHNIQUES SUCH AS COVERING WITH SOIL, MULCH OR WET BURLAP.
4. NO EQUIPMENT, VEHICLES OR MATERIALS SHALL OPERATE OR BE STORED WITHIN THE ROOT PROTECTION ZONE OF ANY TREE NEAR THE PROJECT. ROOT PROTECTION ZONE IS ONE (1) FOOT OF RADIUS PER INCH OF DIAMETER OF THE TREE TRUNK. A 10-INCH DIAMETER TREE WOULD HAVE A 10-FOOT RADIUS PROTECTION ZONE AROUND THE TREE. ROOTS OR BRANCHES IN CONFLICT WITH THE CONSTRUCTION SHALL BE CUT CLEANLY ACCORDING TO PROPER PRUNING METHODS. ALL OAK WOUNDS SHALL BE PAINTED OVER WITHIN 30 MINUTES TO PREVENT OAK WILT. NO DIRECT PAYMENT WILL BE MADE FOR TREE PRUNING.
5. THE CITY ARBORIST SHALL APPROVE ANY TREE REMOVAL, 207-0278.
6. TREES, WHICH ARE DAMAGED OR LOST DUE TO THE CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION, SHALL BE MITIGATED TO THE CITY'S SATISFACTION.
7. TREES, TREE LIMBS, BUSHES AND SHRUBS LOCATED IN THE CITY STREET OR ALLEY RIGHT OF WAY OR PERMANENT EASEMENTS WHICH INTERFERE WITH PROPOSED CONSTRUCTION ACTIVITIES MAY BE NEATLY TRIMMED BY THE CONTRACTOR ONLY AFTER APPROVAL FROM THE PAVEMENT ENGINEERING MANAGEMENT THROUGH THE INSPECTOR.
8. NO EXCESSIVE TREE TRIMMING WILL BE PERMITTED.
9. SAPLINGS, SHRUBS OR BUSHES TO BE CLEARED FROM THE PROTECTED ROOT ZONE AREA OF A LARGE TREE SHALL BE REMOVED BY HAND AS DESIGNATED BY THE INSPECTOR.
10. ALL DEBRIS GENERATED BY THE PRUNING AND TRIMMING OF THE TREES AND/OR BUSHES SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF PROPERLY. (NO SEPARATE PAY ITEM)

STATE OF TEXAS
STEPHEN J. ANIOL
112658
LICENSED
PROFESSIONAL ENGINEER
12/8/16

NO.	REVISION	DRAWN	APPROVED	DATE

Lockwood, Andrews & Newnam, Inc.
A LEO A. DALY COMPANY
TBPE REGISTRATION NO. F-2614

CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

FY 2017 ASPHALT OVERLAY TASK ORDER PACKAGE 5
GENERAL NOTES

SHEET 3 OF 5

	PROJECT NO.: 120-11729-020		DATE: DEC-2016
DRAWN BY:	DSGN. BY:	CHKD. BY:	SHEET NO.:

Plotted on: $DATE$ $TIME$

Design Filename: $FILE$

TRAFFIC NOTES AND SPECIAL CONDITIONS:

1. WORK AROUND SCHOOLS SHALL BE SCHEDULED TO ELIMINATE IMPACTS TO THE SCHOOL. LANES SHALL NOT BE CLOSED DURING THE TIME STUDENTS ARE BEING DROPPED OFF AND PICKED UP FROM SCHOOL. WORK WITHIN A SCHOOL ZONE CAN ONLY OCCUR BETWEEN THE HOURS OF 9 AM AND 2 PM. NO ADDITIONAL PAYMENT WILL BE MADE TO THE CONTRACTOR WORK ZONE TIME RESTRICTIONS.

2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL SIGNS AND BARRICADES ARE PROPERLY INSTALLED AND MAINTAINED. ALL LOCATIONS AND DISTANCES WILL BE DECIDED UPON IN THE FIELD BY THE CONTRACTOR, USING THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

   MULTI LANE USE TXDOT TOP'S
   LOCAL STREET CLOSURES USE CITY STANDARDS
   UNIQUE SITUATIONS USE TMUTCD, NEED PRIOR APPROVAL

3. THE CITY'S CONSTRUCTION INSPECTOR AND TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT BARRICADES AND SIGNS. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE BARRICADES AND SIGNS DO NOT CONFORM TO ESTABLISHED STANDARDS OR ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC, THE CONSTRUCTION INSPECTOR SHALL HAVE THE OPTION TO STOP OPERATIONS UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED. IF THE NEED ARISES, ADDITIONAL BARRICADES AND DIRECTIONAL DEVICES MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE. IT IS THE CONTRACTOR'S SOLE RESPOSIBILITY TO SEE THAT ALL TRAFFIC CONTROL DEVICES ARE PROPERLY INSTALLED AND MAINTAINED AT THE JOB SITE IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS AND RELATED INDUSTRY STANDARDS AND REGULATIONS. THESE NOTES DO NOT, IN AND OF THEMSELVES, CONSTITUTE A TRAFFIC CONTROL PLAN. IN THE EVENT THAT THESE PLANS DO NOT INCLUDE TRAFFIC CONTROL, OR THAT THE CONTRACTOR WISHES TO VARY FROM TRAFFIC CONTROL INCLUDED WITH THESE PLANS, HE SHALL SUBMIT FOR REVIEW A TRAFFIC CONTROL PLAN SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF TEXAS, INCLUDING A SIGN AND BARRICADE PLAN CONFORMING TO THE REQUIREMENTS OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. THE CITY'S CONSTRUCTION OBSERVER/INSPECTOR (COI) AND THE TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT THE TRAFFIC CONTROL DEVICES BEING DEPLOYED. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE COI, THE TRAFFIC CONTROL DEVICES DO NOT CONFORM TO ESTABLISHED STANDARDS OR ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC, THE COI SHALL HAVE THE OPTION TO STOP CONSTRUCTION OPERATIONS AT NO EXPENSE TO THE CITY UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED BY THE CONTRACTOR.

4. FOR STREETS LISTED ON THIS CONSTRUCTION CONTRACT, THE CONTRACTOR SHALL SUBMIT A ENGINEERED TRAFFIC CONTROL PLAN TO THE CITY OF SAN ANTONIO TWO WEEKS PRIOR TO COMMENCING WORK.

5. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL CONTACT THE CITY OF SAN ANTONIO TRAFFIC OPERATIONS SECTION AT 207-7765 FOR A TRAFFIC SIGN AND TRAFFIC SIGNAL INVENTORY, PRIOR TO COMPLETION OF THE CONTRACT AND REMOVAL OF THE BARRICADES. THE CONTRACTOR SHALL AGAIN CONTACT THE TRAFFIC OPERATIONS SECTION. THE BARRICADES SHALL NOT BE REMOVED UNTIL ALL APPLICABLE PERMANENT TRAFFIC SIGNS AND SIGNALS ARE IN PLACE.

6. IT IS THE CONTRACTOR'S RESPONSIILITY TO OBTAIN AND MAINTAIN TEMPORARY STOP SIGNS AND ALL OTHER TRAFFIC CONTROL DEVICES REQUIRED PROTECTING THE GENERAL PUBLIC. IF THE CITY OF SAN ANTONIO HAS REMOVED PERMANENT STOP SIGNS, THE CONTRACTOR SHALL REQUEST THAT THE SIGNS BE RETURNED TO THE CONSTRUCTION SITE TO BE REINSTALLED BY THE CONTRACTOR. ALL PERMANENT SIGNS OR TRAFFIC CONTROL DEVICES MISSING OR DAMAGED UPON COMPLETION OF CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

7. THE CONTRACTOR SHALL MAINTAIN TRAFFIC ON THE PROJECT STREETS THROUGHOUT CONSTRUCTION. IN THE EVENT THE CONTRACTOR MUST CLOSE A STREET TO TRAFFIC, HE SHALL OBTAIN PERMISSION FROM THE TRANSPORTATION & CAPITAL IMPROVEMENTS DEPARTMENT AND SHALL PROVIDE A MINIMUM FORTY EIGHT (48) HOURS NOTICE TO THE FIRE DEPARTMENT AND POLICE DEPARTMENT.

8. AS WORK PROGRESSES, LOCATION OF TEMPORARY TRAFFIC CONTROL DEVICES WILL BE ADJUSTED AND MODIFIED, AS NECESSARY BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL SUPPLY TWO PORTABLE, CHANGEABLE MESSAGE SIGNS FOR THE USE THROUGHOUT THE CONTRACT, WITH A THIRD SERVING AS BACKUP IN THE EVENT ONE BREAKS DOWN.

9. IF THE NEED ARISES, ADDITIONAL TEMPORARY TRAFFIC CONTROL DEVICES, SPECIAL DIRECTIONAL DEVICES AND/OR BUSINESS NAME SIGNS MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE THROUGHOUT THE DURATION OF THE CONTRACT .

10. THE CONTRACTOR MUST MAINTAIN ALL STREETS WITHIN PROJECT LIMITS OPEN TO THROUGH TRAFFIC BY REPAIRING TRENCHES, POTHOLES, LEVELING UP WITH ASPHALT, ETC. AT NO DIRECT PAYMENT, WITH THE COST TO BE INCLUDED IN OTHER ITEMS.

11. WHEN CONSTRUCTION WORK NECESSITATES THE UTILIZATION OF VEHICLE PATHS OTHER THAN THE LANES NORMALLY USED, TRAFFIC CONTROL MARKINGS NO LONGER APPLICABLE SHALL BE REMOVED AND APPROVED TEMPORARY PAVEMENT MARKINGS AND SIGNS INSTALLED IN ACCORDANCE WITH PART VI-D OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

12. ALL TEMPORARY TRAFFIC CONTROL DEVICES, ETC. SHALL BE PROVIDED BY THE CONTRACTOR WITHOUT DIRECT PAYMENT, UNLESS OTHERWISE NOTED OR STATED. TEMPORARY TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE CITY'S "TYPICAL SIGN AND BARRICADE STANDARDS" SHEETS AND TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

13. THE CONTRACTOR WILL BE RESPONSIBLE FOR FURNISHING ALL RESIDENTS AND BUSINESSES WITH AN INFORMATION FLYER ON ALL JOBS DURING CONSTRUCTION.

14. ANY DAMAGE TO PERMANENT TRAFFIC SIGNALS, THE CONTROLLER BOX, LOOPS OR CONDUITS DURING OR UPON COMPLETION OF THE PROJECT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE. THE DECISION TO REPAIR, AS OPPOSED TO REPLACE, THE DAMAGED EQUIPMENT SHALL BE MADE BY THE CITY'S TRAFFIC ENGINEER.

15. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE LANE OPEN TO TRAFFIC AT ALL TIMES. UNIFORMED OFF-DUTY POLICE OFFICER SHALL BE ON SITE IF ONE LANE CANNOT REMAIN OPEN. FOR PROJECTS THAT REQUIRE A POLICE OFFICER, THE CONTRACTOR WIL NOT BE ALLOWED TO START ANY FORM OF CONSTRUCTION UNTIL THE POLICE OFFICER IS DIRECTING TRAFFIC.

16. OFF DUTY POLICE OFFICERS WILL BE REQUIRED AS DIRECTED BY THE TRAFFIC ENGINEER. PAYMENT WIL BE MADE UNDER ITEM SUP 2 POLICE OFFICER. THIS WILL BE A REQUIREMENT WHERE TWO-WAY TRAFFIC IS TO BE MAINTAINED. ALL OFF DUTY OFFICERS AND CONTRACTOR CREWS HANDLING TRAFFIC MUST BE LISTED AS CERTIFIED OR QUALIFIED FLAGGERS BY CONTRACTOR.

17. THE CONTRACTOR SHALL SCHEDULE HIS WORK SUCH THAT EACH STREET WILL BE SUBSTANTIALLY COMPLETE PRIOR TO MOVING HIS CONSTRUCTION OPERATION TO ANOTHER STREET. MORE THAN ONE STREET CAN BE UNDER CONSTRUCTION WITH THE PRIOR APPROVAL FROM THE CITY AND EACH STREET HAS CONTINUOUS, ACTIVE AND UNINTERRUPTED CONSTRUCTION OPERATION ON THAT STREET.

18. CONTACT THE CITY TRAFFIC OPERATIONS AT 210-207-7765 PRIOR TO ANY MILLING.

19. ALL EXISTING PAVEMENT MARKERS SHALL BE REMOVED BY THE CONTRACTOR ONLY AS THE WORK PROGRESSES AND AS APPROVED BY THE ENGINEER. THIS WORK WILL NOT BE PAID FOR SEPERATELY, BUT SHALL BE CONSIDERED SUBSIDARY TO THE VARIOUS BID ITEMS. MATERIALS REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR, AND SHALL BE DISPOSED OF PROPERLY.

20. THE CONTRACTOR SHALL NOT COMMENCE WORK ON A STREET PRIOR TO 8 AM. THE PLACEMENT AND MOVEMENT OF SIGNS AND BARRICADES CONSTITUTES WORK AND SHALL NOT BE STARTED UNTIL AFTER THE 8 AM TIME FRAME.

21. THE CONTRACTOR SHALL MAINTAIN CONTINUOUS ACCESS TO ALL INTERSECTING STREETS UNLESS OTHERWISE SHOWN ON THESE PLANS. WHEN CONTINUOUS ACCESS IS SCHEDULED TO BE BLOCKED, THE CONTRACTOR SHALL CONTACT THE DISPATCHERS FOR THE FIRE DEPT AND EMS AT (210) 227-8341 AND THE POLICE DEPT AT (210) 207-2257, TO APPRISE THEM OF THE PENDING STREET CLOSURE AT LEAST FORTY-EIGHT (48) HOURS IN ADVANCE. IF THE CLOSURE FALLS ALONG A BUS ROUTE, THE CONTRACTOR SHALL ALSO CONTACT VIA AT (210) 362-5220. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SUITABLE ACCESS ACCOMMODATIONS FOR SCHOOL CHILDREN AND PEDESTRIANS.

22. THE CONTRACTOR SHALL MAINTAIN EITHER THE EXISTING OR TEMPORARY STREET NAME SIGN AT EACH INTERSECTION ONSITE THROUGHOUT CONSTRUCTION. IF THE EXISTING STREET NAME SIGNS ARE USED, THEY MUST BE MAINTAINED IN THE CONDITION ENCOUNTERED PRIOR TO THE BEGINNING OF CONSTRUCTION, AND BE TURNED IN TO THE CITY INSPECTOR AT THE END OF THE PROJECT. IF TEMPORARY SIGNS ARE USED DURING THE CONSTRUCTION, THEY SHALL HAVE A MINIMUM OF 4-INCH LETTERS, AND MAY BE FABRICATED WITH CONSTRUCTION ZONE MATERIAL (BLACK LEGEND ON ORANGE BACKGROUND, USING PLYWOOD, SUBSTRATE, ETC.)

23. AFTER THE CONTRACTOR HAS MADE THE REQUIRED MANHOLE AND VALVE ADJUSTMENTS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROPERLY BARRICADE AND MAINTAIN THE BARRICADES TO ENSURE THAT THE PUBLIC IS SAFEGUARDED WHILE TRAVELING WITHIN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEER FOR A REVIEW OF THE ADEQUACY OF THE BARRICADES. THERE WILL BE NO SEPARATE PAYMENT FOR THIS ITEM.

24. ALL TRAFFIC CONTROL DEVICES, PLACEMENT AND ACTIVITIES SHALL BE AS PER THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD). IF THERE IS ANY CONFLICT BETWEEN THE TXMUTCD AND TRAFFIC CONTROL REQUIREMENTS WITHIN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.

25. FOR STREETS WHICH ACCOMMODATE FOUR (4) OR MORE TRAFFIC LANES, THE FOLLOWING RESTRICTIONS WILL APPLY:

    A. TWO-WAY TRAFFIC SHALL BE MAINTAINED.

    B. A MINIMUM OF TWO LANES SHALL REMAIN OPEN FOR TRAFFIC.

    C. NO MORE THAN 1,000 LINEAR FEET OF A ROADWAY LANE MAY BE CLOSED DURING CONSTRUCTION OPERATION.

    D. A MINIMUM OF ONE (1) OFF-DUTY POLICE OFFICER SHALL BE REQUIRED ON SITE DURING BASE FAILURE REPAIR, MILLING AND H.M.A.C. OVERLAY OPERATIONS.

26. FLASHING WARNING LIGHTS AND/OR FLAGS SHALL BE USED TO CALL ATTENTION TO ALL ADVANCE WARNING SIGNS.

27. SIGNS WHICH READ "CONSTRUCTION AHEAD, TRAFFIC DELAYS TO BE EXPECTED" SHALL BE PLACED AT EACH END OF WORK AREA. SAID SIGNS SHALL BE 60"X30" AND SHALL BE ORANGE WITH BLACK LETTERING.

28. ALL TRAFFIC MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE CITY TRAFFIC ENGINEER. HE SHALL BE GIVEN A MINIMUM OF SEVENTY-TWO (72) HOURS NOTICE PRIOR TO THE APPLICATION OF ANY MARKINGS.

29. THE CONTRACTOR SHALL NOTIFY THE TEXAS DEPARTMENT OF TRANSPORTATION PRIOR TO WORKING AT THE INTERSECTION OF ANY STATE OWNED OR MAINTAINED ROADWAY.

30. ALL STREETS, FOR THEIR FULL WIDTH, SHALL BE OPENED TO TRAFFIC AT THE END OF EACH WORK PERIOD.

STATE OF TEXAS
STEPHEN J. ANIOL
112658
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PROFESSIONAL ENGINEER
12/8/16

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A LEO A. DALY COMPANY
TBPE REGISTRATION NO. F-2614

CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

FY 2017 ASPHALT OVERLAY
TASK ORDER PACKAGE 5
GENERAL NOTES

SHEET 4 OF 5

DRAWN BY:	PROJECT NO.: 120-11729-020		DATE: DEC-2016
	DSGN. BY:	CHKD. BY:	SHEET NO.:

Plotted on: $DATE$ $TIME$

TRAFFIC NOTES AND SPECIAL CONDITIONS: (CONTINUED)

31. AT NO DIRECT PAYMENT, APPROVED TEMPORARY SHORT-TERM EXPENDABLE PAVEMENT MARKINGS SHALL BE PROVIDED TO DELINEATE LANE CONTINUITY PRIOR TO THE APPLICATION OF STANDARD MARKINGS BY THE USE OF FLEXIBLE RELECTIVE ROAD MARKER TABS. ONCE THE EXISTING STANDARD PAVEMENT MARKINGS HAVE BEEN OBLITERATED, SUCH TABS SHALL REMAIN IN PLACE FOR A MAXIMUM OF FOURTEEN (14) DAYS AFTER WHICH TIME STANDARD THERMOPLASTIC PAVEMENT MARKINGS MUST BE APPLIED. AT THE CONTRACTOR'S OPTION, THE CONTRACTOR MAY APPLY STANDARD PAINTED MARKINGS PRIOR TO THE APPLICATION OF THE THERMOPLASTIC MARKINGS FOR AN INTERIM PERIOD OF TIME. SUBSEQUENT TO AN INITIAL APPLICATION OF STANDARD PAINTED MARKING, REPEATED APPLICATIONS OF SUCH MAY BECOME NECESSARY UNTIL STANDARD THERMOPLASTIC TRAFFIC MARKINGS ARE IN PLACE. AS A FUNCTION OF THE MARKINGS EFFECTIVE VISIBILITY, THE ENGINEER WILL DETERMINE WHEN RE-APPLICATION OF THE PAINTED MARKINGS IS NECESSARY. PAINTED MARKINGS SHALL BE APPLIED TO DELINEATE FULL CENTERLINES AND LANE LINES AND WILL REQUIRE GLASS BEADS. PAYMENT OF INITIAL PAINTED MARKING APPLICATION AND ALL REPEATED APPLICATIONS OF PAINTED MAKINGS SHALL BE AT NO DIRECT PAYMENT.

32. CONTRACTOR TO CONTACT THE CITY TRAFFIC ENGINEER OFFICE AT 207-7758 FORTH-EIGHT (48) HOURS PRIOR TO SIDEWALK AND CURB CONSTRUCTION WHERE CITY OWNED TRAFFIC FACILITIES EXIST. CONTRACTOR SHALL SECURE APPROVAL FROM ENGINEER OR PROJECT MANAGER PRIOR TO SUCH CONSTRUCTION. NO WIRE SPLICES SHALL BE MADE OUTSIDE THE PULL BOX. IF WIRES SHOULD BE CUT OUTSIDE THE PULL BOX BY THE CONTRACTOR, SAID CONTRACTOR SHALL THEN REPLACE THE ENTIRE WIRE AT NO EXTRA PAY.

33. LOCATION AND LAYOUTS OF DETECTOR LOOP REPLACEMENTS SHALL BE VERIFIED BY THE CITY ENGINEER PRIOR TO THEIR REMOVAL AND INSTALLATION.

34. PAVEMENT MARKINGS ARE TO BE COMPLETED NO LATER THAN SEVEN (7) DAYS AFTER MAINTENANCE APPLICATION IS PLACED. PERMANENT PAVEMENT MARKINGS SHALL BE APPLIED PRIOR TO THE OPENING OF THE COMPLETED STREET TO TRAFFIC. TEMPORARY ADDITIONAL SHORT-TERM EXPENDABLE PAVEMENT MARKINGS MAY BE PROVIDED PRIOR TO THE APPLICATION OF PERMANENT MARKINGS IN MINIMUM LENGTHS OF 36", OR RAISED PAVEMENT MARKINGS TO DELINEATE CONTINUITY UNTIL SUCH TIME AS STANDARD PAVEMENT MARKINGS IN NORMAL LENGTHS CAN BE PLACED AT NO DIRECT PAYMENT.

35. CONTRACTOR TO CONTACT CITY TRAFFIC ENGINEER SEVEN (7) DAYS PRIOR TO COMMENCING WORK ON STREETS WITH BIKE LANES. BIKE LANE MARKING LAYOUT SHALL BE PROVIDED TO THE CONTRACTOR BY THE CITY TRAFFIC ENGINEER.

36. DURING ASPHALT OVERLAY, THE CONTRACTOR SHALL ALLOW RESIDENTS TRAFFIC ACCESS TO THE STREET WITH PROPER GUIDANCE, DIRECTION, FLAGMEN AND TRAFFIC CONTROL, AND ONLY AT SUCH TIME THAT DAMAGE WILL NOT OCCUR TO THE NEW ASPHALT OVERLAY OR TO THE VEHICLES. THIS INCLUDES BUT IS NOT LIMITED TO DAMAGE RESULTING FROM TACK COAT ON THE VEHICLES PAINTED SURFACES.

37. IN SO FAR AS POSSIBLE, THE CONTRACTOR SHALL SCHEDULE AND CONDUCT STREET OPERATIONS IN THE INTERSECTIONS AS RAPIDLY AS POSSIBLE TO MINIMIZE THE LENGTH OF TIME THE INTERSECTIONS WILL BE CLOSED TO TRAFFIC.

38. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ALL STREETS OUTSIDE OF THE PROJECT LIMITS WHICE ARE DAMAGED DUE TO CONSTRUCTION ACTIVITIES. THE CITY'S STREET ENGINEER MUST APPROVE THE REPLACED SECTION. THERE WILL BE NO DIRECT PAYMENT FOR THIS WORK. THE COST IS TO BE INCLUDED IN OTHER ITEMS.

39. IF REQUIRED, A BARRICADE COMPANY SHALL SUPPLY THE CONTRACTOR WITH A SUFFICIENT NUMBER OF QUALITY STANDARD BARRICADES AND OTHER TRAFFIC CONTROL DEVICES BY M.U.T.C.D. STANDARDS AS NEEDED. THE BARRICADE COMPANY SHALL ALSO SUPPLY THE CONTRACTOR WITH TWO (2) FULL TIME QUALIFIED PERSONNEL WHOSE SOLE RESPONSIBILITIES PERTAINING TO THIS PROJECT ARE TO ESTABLISH AND MAINTAIN PROPER CONSTRUCTION WORK ZONE TRAFFIC CONTROL AND RELATED DEVICES. THESE PERSONS SHALL PROVIDE DOCUMENTED EVIDENCE THEY HAVE RECEIVED SPECIALIZED TRAINING IN CONSTRUCTION WORK ZONE TRAFFIC CONTROL WITHIN TWO YEARS OF THE CONTRACT DATE. ANY AND ALL TRAFFIC CONTROL DEVICES NEEDED AND NECESSARY PERSONNEL WILL BE THE CONTRACTOR'S EXPENSE.

40. THE CONTRACTOR MUST CONTACT THE CITY'S COI FORTY EIGHT (48) HOURS IN ADVANCE (NOT INCLUDING WEEKENDS) OF ANY MINOR STREET CLOSURE. IT WILL BE THE CONTRACTOR'S RESPONSIBIILTY TO ADVISE THE COI TEN (10) DAYS IN ADVANCE TO ARTERIAL TOTAL STREET CLOSURE. THIS MUCH TIME IS NECESSARY TO INSTALL ADVISORY SIGNS AND GIVE THE MOTORIST A MINIMUM OF SEVEN (7) DAYS NOTICE OF THE STREET CLOSURE. THE COI, AFTER BEING NOTIFIED, WILL CONTACT THE TRAFFIC ENGINEERING OFFICE TO MAKE THE NECESSARY ARRANGEMENTS.

Design Filename: $FILE$

STATE OF TEXAS
STEPHEN J. ANIOL
112658
LICENSED
PROFESSIONAL ENGINEER
12/8/16

NO.	REVISION	DRAWN	APPROVED	DATE

Lockwood, Andrews & Newnam, Inc.
A LEO A. DALY COMPANY
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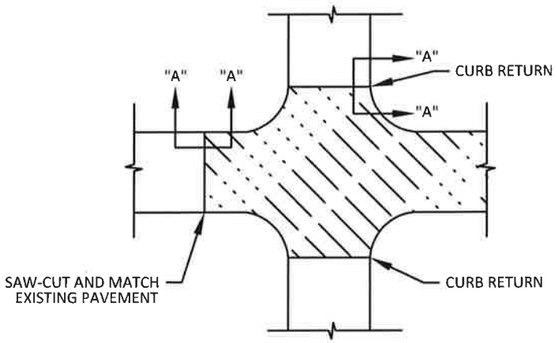
CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

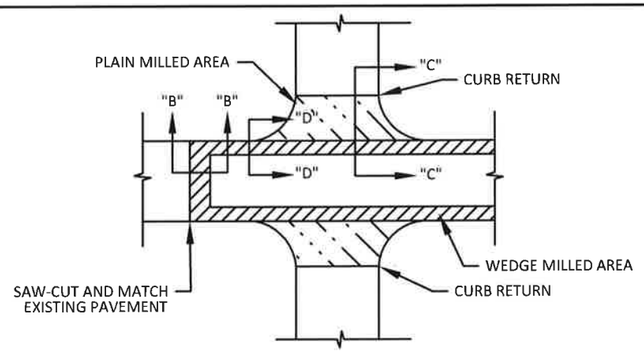
FY 2017 ASPHALT OVERLAY
TASK ORDER PACKAGE 5
GENERAL NOTES

SHEET 5 OF 5

DRAWN BY:	PROJECT NO.: 120-11729-020		DATE: DEC-2016
	DSGN. BY:	CHKD. BY:	SHEET NO.:



PLAN AT
CROSS STREET
PLANE MILL
NOT TO SCALE



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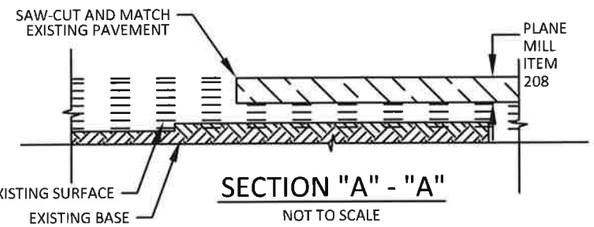

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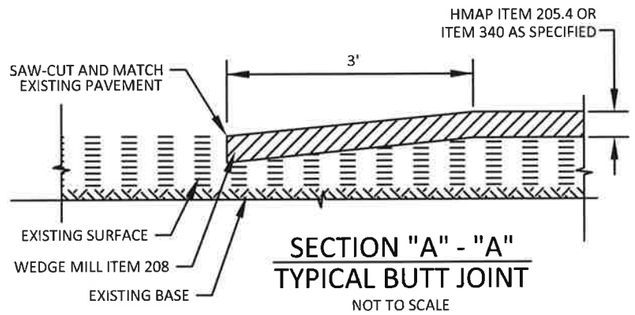

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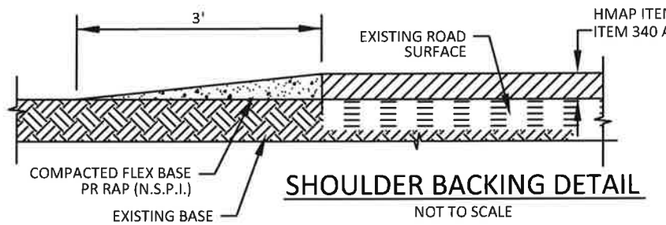
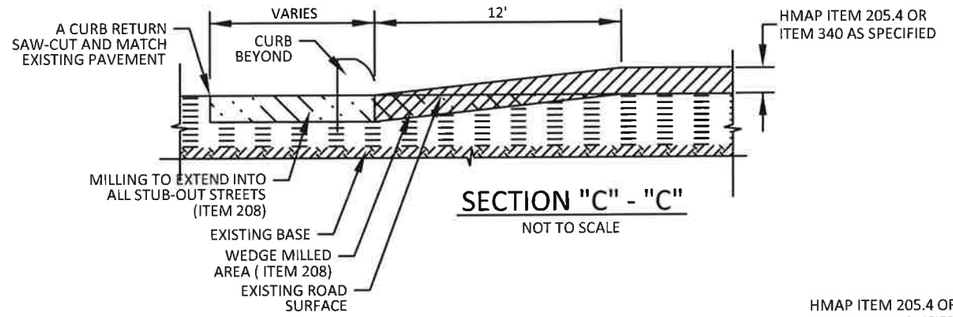


SHOULDER BACKING DETAIL
NOT TO SCALE



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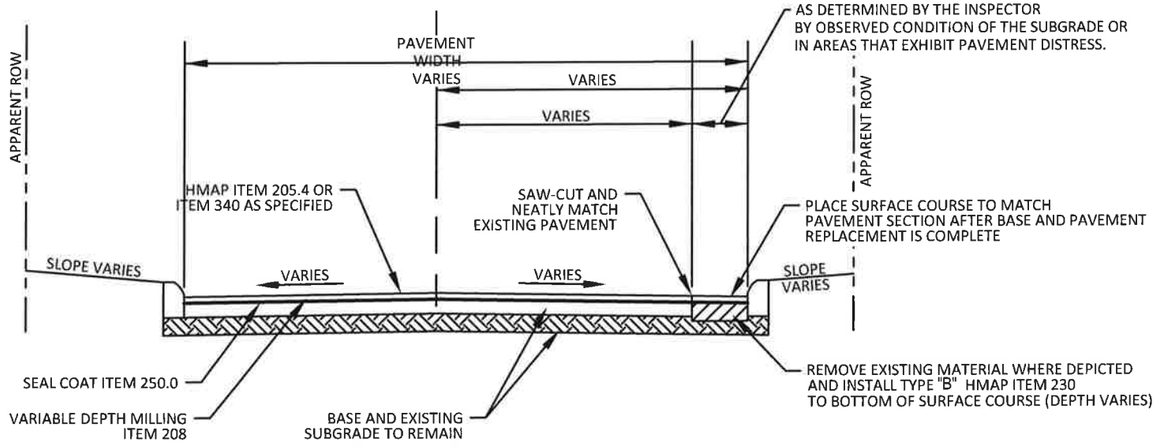
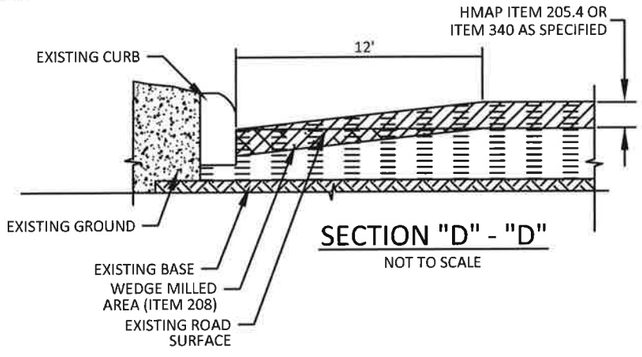


ASPHALT OVERLAY SECTION
NOT TO SCALE



SECTION "D" - "D"
NOT TO SCALE

NOTES:

1. SECTIONS SHOWN ON THIS SHEET ARE NOT TYPICAL AND DO NOT REPRESENT ALL STREET LOCATIONS. SOME STREETS MAY HAVE CURB ON BOTH SIDES OR NO CURB PRESENT AT ALL.
2. SOME SECTIONS MAY BE CROWNED OR HAVE STRAIGHT CROSS SLOPES.
3. FOR SEAL COAT (ITEM 250.0) SEE GENERAL NOTES FOR MATERIAL DATA.
4. ASPHALT OVERLAY PROJECT MILL DEPTH IS 2".

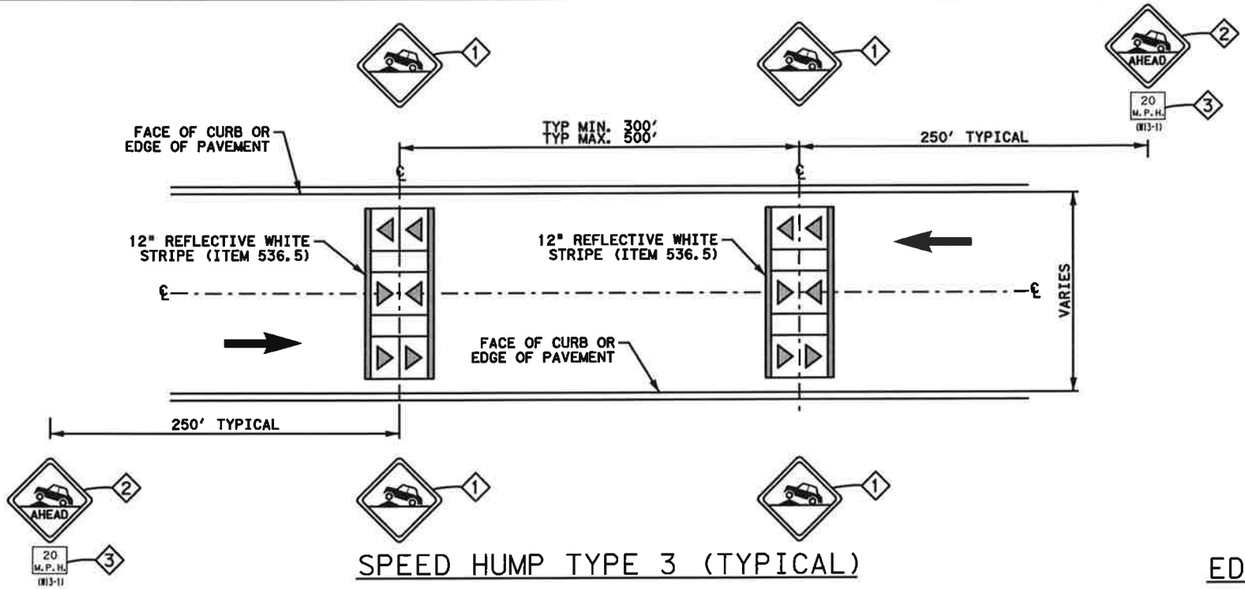
NO.	REVISION	DRAWN	APPROVED	DATE

Lockwood, Andrews & Newnam, Inc.
TBPE REGISTRATION NO. F-2614

CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

ASPHALT OVERLAY CONTRACT
DETAIL SHEET

DRAWN BY:	PROJECT NO.:		DATE: SEP 2015
	DSGN. BY:	CHKD. BY:	SHEET NO.:



SPEED HUMP TYPE 3 (TYPICAL)

NTS

GENERAL NOTES:

1. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE TRAFFIC ENGINEERING DIVISION AT 207-2075 TO SCHEDULE THE INSPECTION OF THE SPEED CUSHIONS.

2. CONTRACTOR SHALL CONTACT THE CONSTRUCTION COORDINATOR AT 207-2075 BEFORE ANY STREET IS TEMPORARILY CLSOED FOR CONSTRUCTION.

3. NO PART OF A SPEED CUSHION SHALL BE LOCATED IN FRONT OF A DRIVEWAY APPROACH. RATHER THEY SHOULD BE A MINIMUM OF 6 FEET FROM THE EDGE OF DRIVEWAY, WHEN PRACTICAL.

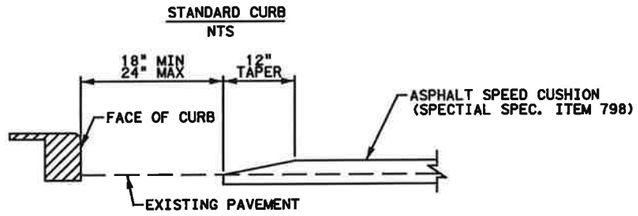
4. SPEED CUSHIONS SHOULD BE PLACED AS CLOSE AS POSSIBLE TO PROPERTY LINES INSTEAD OF MID-LOT, WHERE PRACTICAL.

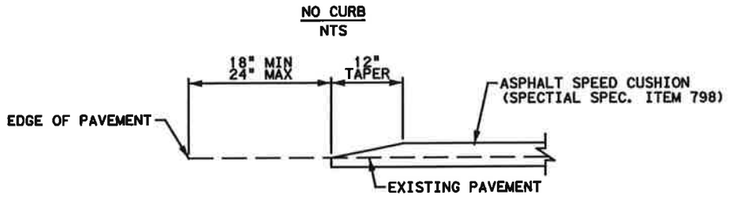
5. SPEED CUSHIONS SHOULD BE INSTALLED AT A RIGHT ANGLE TO THE CENTERLINE TANGENT OF THE ROADWAY.

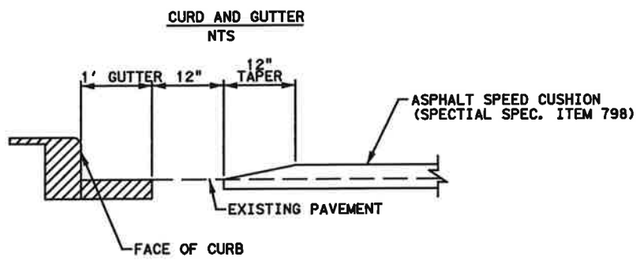
6. CONTRACTOR SHALL NOT OPEN SPEED CUSHION TO TRAFFIC UNTIL ALL REQUIRED WARNING SIGNS AND MARKINGS ARE COMPLETE.

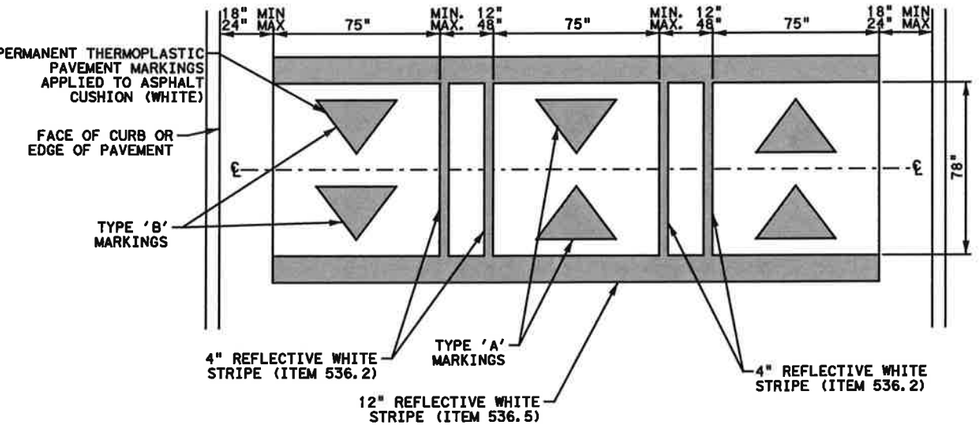
1. W17-3 - Sa SPECIAL SIGN (HUMP SYMBOL SIGN)
2. W17-3 - Sa SPECIAL SIGN (HUMP AHEAD SYMBOL SIGN)
3. W13-1 ADVISORY SPEED SIGN (20MPH)

EDGE DETAIL









SPEED HUMP CONFIGURATION DETAIL

NTS

PAVEMENT WIDTH (FT)	NO. OF HUMPS	GAP (IN)	HUMP (IN)	GAP (IN)	HUMP (IN)	GAP (IN)	HUMP (IN)	GAP (IN)	HUMP (IN)	GAP (IN)	HUMP (IN)	GAP (IN)
30	3	33.5	75	34	75	34	75	33.5	-	-	-	-
36	4	48	75	12	75	12	75	12	75	48	-	-
40	4	48	75	28	75	28	75	28	75	48	-	-
44	4	48	75	44	75	44	75	44	75	48	-	-

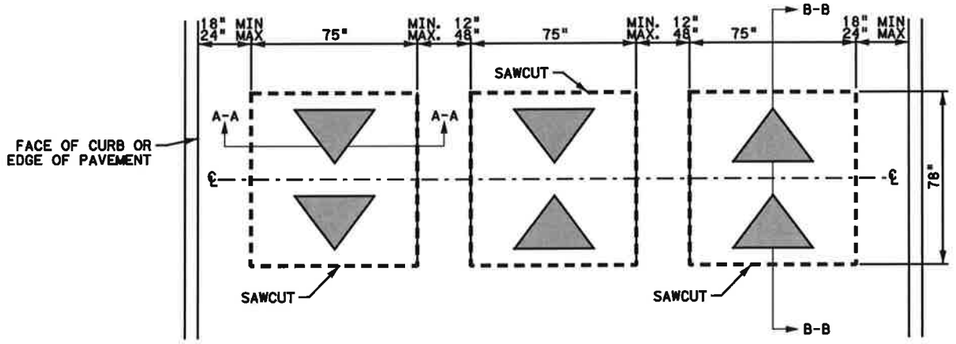
JUNE 2016

CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

ASPHALT CONCRETE SPEED CUSHION TYPE III DETAIL

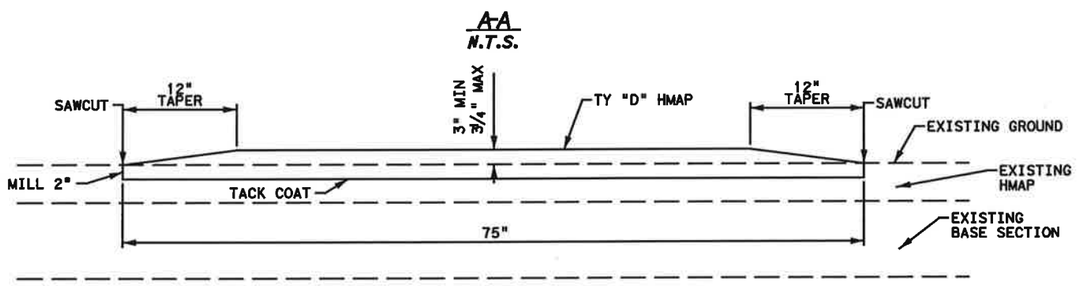
100% SUBMITTAL	PROJECT NO.:		DATE: 6/10/16
DRAWN BY:	DSGN. BY:	CHKD. BY:	SHEET NO.:

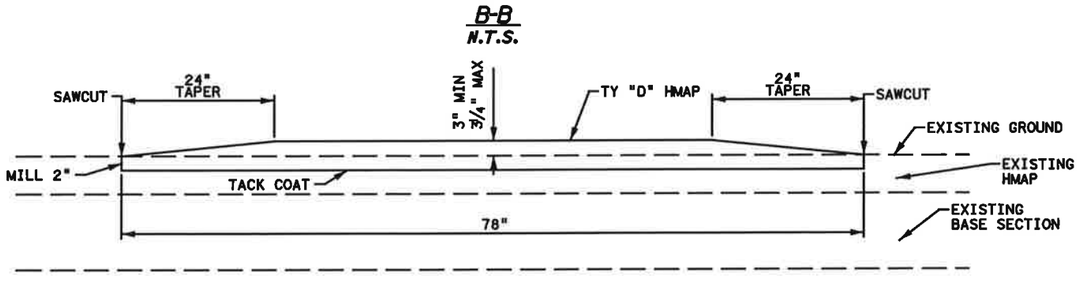
Plotted on: 6/10/2016 9:50:54 AM
Design Filename: c:\projectwise\sjamiol\d0337880\2015-10-14SpeedHumpDetail*Sheet*1.dgn

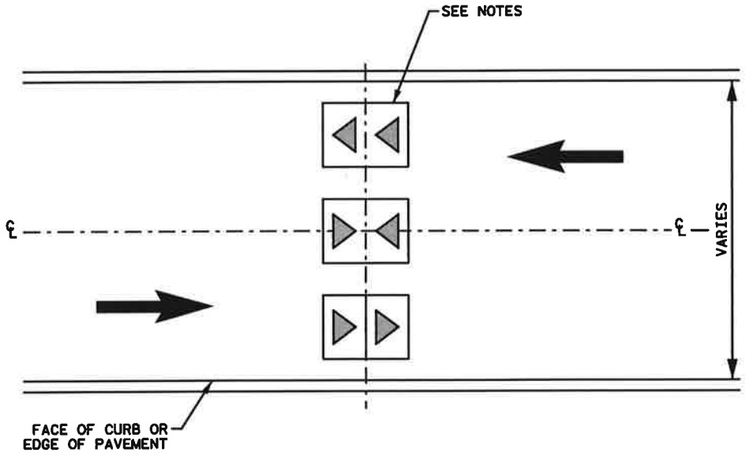


NOTE:

1. CONTRACTOR TO TAKE INTO ACCOUNT COMPACTION TO ACHIEVE REQUIRED DIMENSIONS.
2. SPEED HUMP HEIGHT SHALL BE 3" MINIMUM WITH A MAXIMUM HEIGHT OF 3/4" AFTER COMPACTION.
3. ASPHALT MILL AND OVERLAY LIMITS TO BE VERIFIED BY THE ENGINEER OR PROJECT MANAGER PRIOR TO INSTALLATION OF TYPE III SPEED CUSHION. CITY MAY CHOOSE TO COMPLETE BASE AND PAVEMENT REPLACEMENT AS PART OF MILL AND OVERLAY LIMITS. BASE AND PAVEMENT REPLACEMENT SHALL FOLLOW CITY OF SAN ANTONIO SPECTIFICATION 230. PAYMENT FOR BASE AND PAVEMENT REPLACEMENT SHALL FOLLOW CoSA ITEM 230.
4. EXISTING RUBBER CUSHIONS THAT ARE REMOVED FOR INSTALLATION OF TYPE III SPEED CUSHIONS SHALL BECOME THE PROPERTY OF THE CONTRACTOR.
5. ACTUAL MILL AND OVERLAY LIMITS TO VARY DEPENDING ON CONDITION OF EXISTING PAVEMENT. PAYMENT FOR MILL LIMITS TO BE UNDER ITEM 208.1 SALVAGING, HAULING, & STOCKPILING RECLAIMABLE ASPHALTIC MATERIAL.







MILL AND OVERLAY LIMITS

NTS

SEPTEMBER 2016

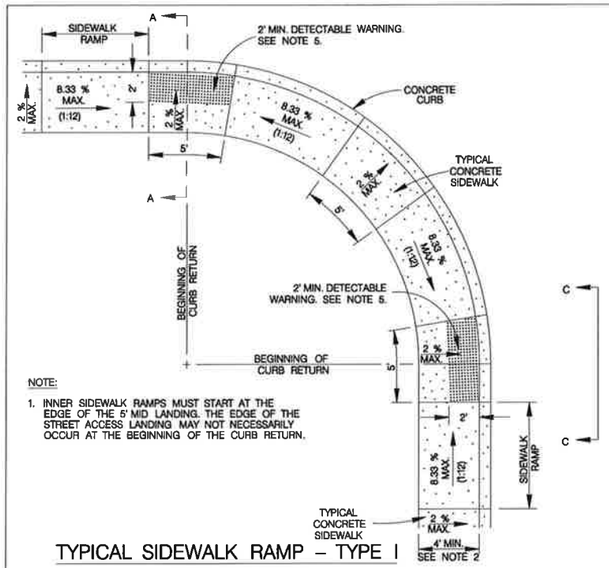
CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS

ASPHALT CONCRETE SPEED CUSHION TYPE III DETAIL

100% SUBMITTAL	PROJECT NO.:		DATE: 9/30/16
DRAWN BY:	DSGN. BY:	CHKD. BY:	SHEET NO.:

Plotted on: $DATE$ $TIME$

Design Filename: $FILE$

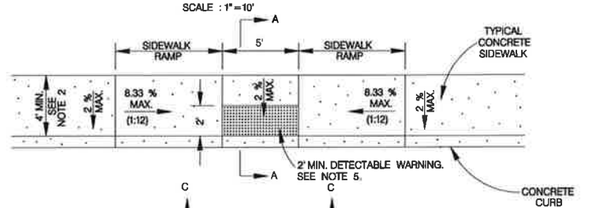


NOTE:

1. INNER SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' MID LANDING. THE EDGE OF THE STREET ACCESS LANDING MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.

TYPICAL SIDEWALK RAMP – TYPE I

SIDEWALK ABUTS THE CURB
SCALE : 1" = 10'

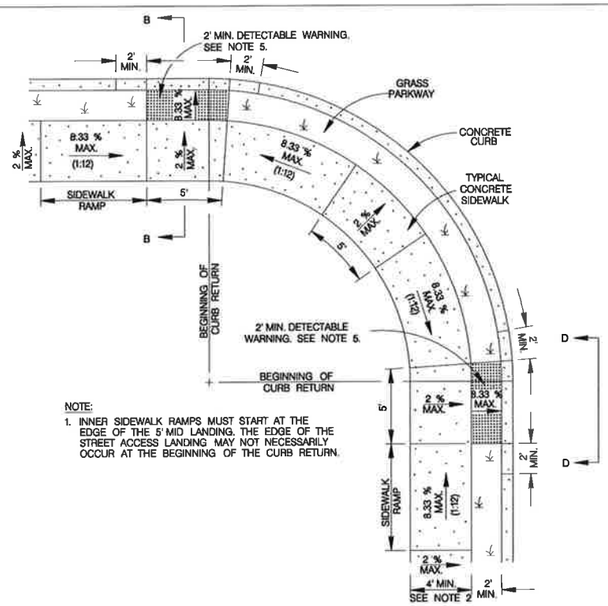


TYPICAL SIDEWALK RAMP – TYPE II

USED AT TEE INTERSECTIONS WHERE SIDEWALK ABUTS CURB
SCALE : 1" = 10'

GENERAL NOTES

1. WHEN POSSIBLE SIDEWALKS SHOULD BE PLACED NEXT TO THE PROPERTY LINE, ALLOWING A MININMUM OF 1 FOOT BUFFER. DEVIATION OF THE PATHWAY FROM A STRAIGHT LINE IS ENCOURAGED TO AVOID TREES OR OTHER OBSTRUCTIONS.
2. FOR LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 2' FROM THE BACK OF CURB.
3. FOR OTHER THAN LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND SEPARATED A MINIMUM OF 2' FROM THE BACK OF CURB OR AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
4. SIDEWALK RAMP LENGTHS PRESENTED IN TABLE 1 ARE GUIDELINES ONLY. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE.
5. ALL CURB-RAMPS OR LANDINGS ABUTTING THE CROSSWALK SHALL HAVE A DETECTABLE WARNING 24 INCHES DEEP (IN THE DIRECTION OF PEDESTRIAN TRAVEL) AND EXTENDING THE FULL WIDTH OF THE CURB RAMP OR LANDING. THE DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES, ALIGNED IN A GRID PATTERN WITH A DIAMETER OF A NOMINAL 0.9 INCHES (23 MM), A HEIGHT OF NOMINAL 0.2 INCHES (5 MM) AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 INCHES (60 MM). THE DETECTABLE WARNING SURFACE SHALL BE A CAST-IN-PLACE TILE CONFORMING TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS OR PAVERS CONFORMING TO TXDOT STANDARD PED-05, PEDESTRIAN FACILITIES.
6. DETECTABLE WARNINGS SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE.
7. SIDEWALK RAMP TYPE V SHALL BE USED ONLY WHERE THERE IS SIGNIFICANT RESTRICTION WITHIN THE PARKWAY TO CONSTRUCT TYPE I OR TYPE III RAMPS.
8. CONSTRUCTION OF ALL WHEELCHAIR RAMPS TO BE INCLUDED UNDER ITEMS "500 – CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER" AND / OR "502 – CONCRETE SIDEWALKS". RAMP SURFACE SHALL BE BRUSH FINISHED.
9. THESE DETAILS ARE FOR REFERENCE ONLY. ACTUAL LOCATIONS OF WHEELCHAIR RAMPS TO BE SHOWN ON CONSTRUCTION PLANS. CITY CONSTRUCTION INSPECTOR CAN ADJUST LOCATIONS FOR SAFETY OR UTILITY CLEARANCE.
10. SIDEWALKS LESS THAN 5 FEET IN WIDTH SHALL BE PROVIDED WITH A PASSING SPACE AT A MAXIMUM SPACING OF 200 FEET.
11. WHEELCHAIR RAMP SHALL BE CONSTRUCTED WITH 4" CLASS "A" CONCRETE AND 2" MINIMUM GRAVEL, CRUSHED ROCK OR FLEXIBLE BASE MATERIAL.
12. REINFORCING STEEL SHALL BE #3 BARS AT 18" O.C.E.W. OR 6" x 6" – W2.9 x W2.9 WIRE MESH.
13. SIDEWALK GRADES SHALL NOT EXCEED THE GRADE ESTABLISHED FOR THE ADJACENT ROADWAY, ANY SIDEWALK CONSTRUCTION THAT DEVIATES FROM THE NATURAL GRADE OF THE ROADWAY TO CREATE A GRADE STEEPER THAN THE EXISTING ROADWAY WILL REQUIRE RAMPS, HANDRAILS AND RESTING PLATFORMS TO BE CONSTRUCTED IN ACCORDANCE WITH ADA AND TAS STANDARDS.
14. SIDEWALK CROSS GRADE SHALL HAVE A MAXIMUM SLOPE OF 2%. LANDINGS SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
15. THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES SHALL BE LESS THAN 11%. THE CHANGE OF GRADE SHALL BE DEFINED AS THE ALGEBRAIC DIFFERENCE OF THE ADJACENT SURFACE SLOPES. IN THE CASE OF A STREET ACCESS RAMP DESIGNED AT THE 8.33% MAXIMUM SLOPE, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN 2.67% (I.E. 8.33–(–2.67) = 11). IN ADDITION, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN OR EQUAL TO 5%.
16. IF THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES IS GREATER THAN OR EQUAL TO 11%, A LEVELING STRIP, 2 FEET IN LENGTH, SHALL BE PROVIDED TO TRANSITION THE ADJACENT SURFACES.
17. ADA COMPLIANCE IN ALTERATIONS INCLUDE ONLY THAT WORK WITHIN THE LIMITS, BOUNDARIES OR SCOPE OF A PLANNED PROJECT.

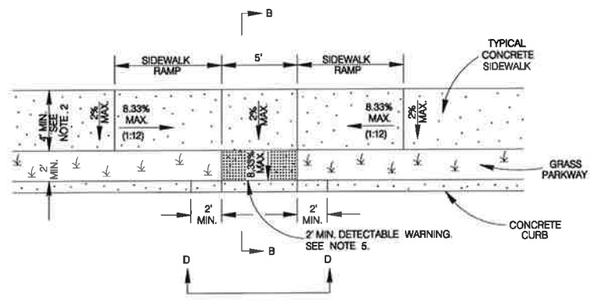


NOTE:

1. INNER SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' MID LANDING. THE EDGE OF THE STREET ACCESS LANDING MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.

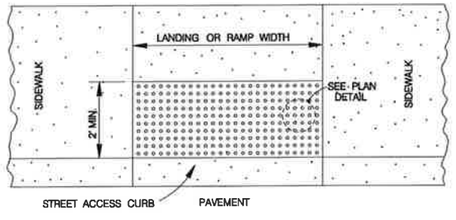
TYPICAL SIDEWALK RAMP – TYPE III

SIDEWALK SEPARATED FROM CURB
SCALE : 1" = 10'



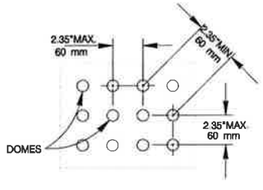
TYPICAL SIDEWALK RAMP – TYPE IV

USED AT TEE INTERSECTIONS WHERE SIDEWALK IS SEPARATED FROM CURB
SCALE : 1" = 10'



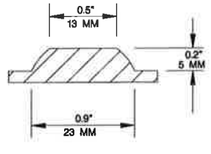
DETECTABLE WARNING SURFACE

SCALE : 1" = 4'



PLAN DETAIL

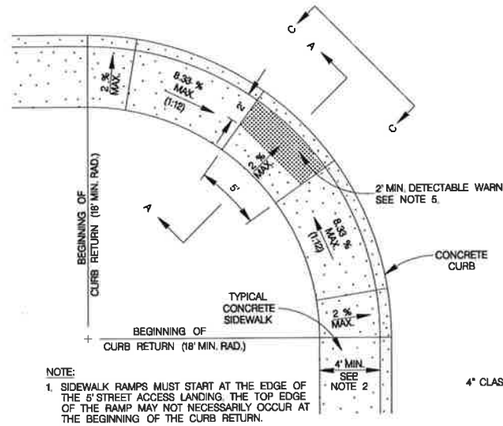
NO SCALE



DOME SECTION

NO SCALE

NOTE:
STAMPED CONCRETE TRUNCATED DOMES WILL NOT BE ALLOWED TO BE USED FOR DETECTABLE WARNING ON WHEELCHAIR RAMPS. CONTRACTOR MUST SUBMIT TRUNCATED DOME INFORMATION THAT IS TO BE USED ON WHEELCHAIR RAMPS TO THE PROJECT MANAGER FOR APPROVAL AT LEAST 30 DAYS PRIOR TO INSTALLATION.

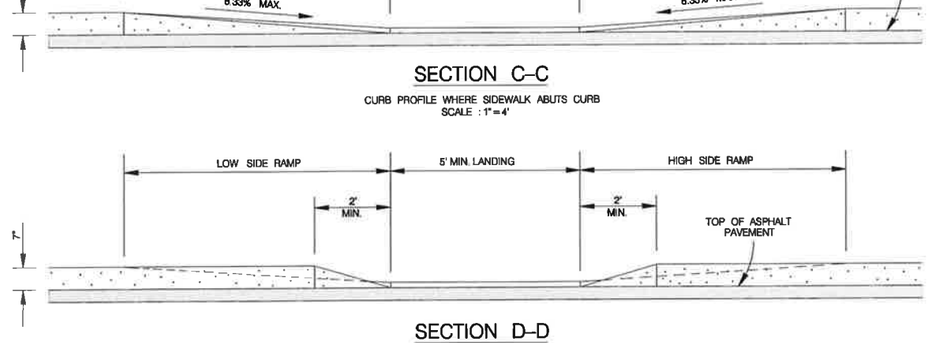


NOTE:

1. SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' STREET ACCESS LANDING. THE TOP EDGE OF THE RAMP MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.
2. TYPE V RAMPS MUST HAVE 18' MIN. RADIUS.

TYPICAL SIDEWALK RAMP – TYPE V

SIDEWALK ABUTS CURB
SCALE : 1" = 10'

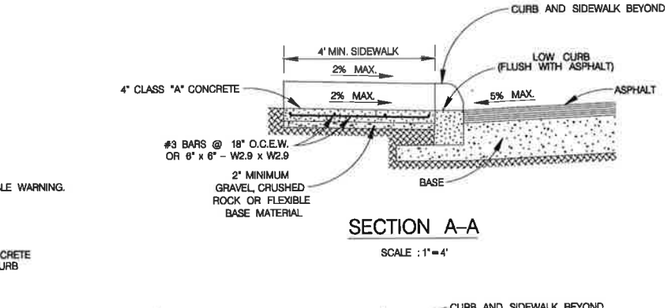


SECTION C–C

CURB PROFILE WHERE SIDEWALK ABUTS CURB
SCALE : 1" = 4'

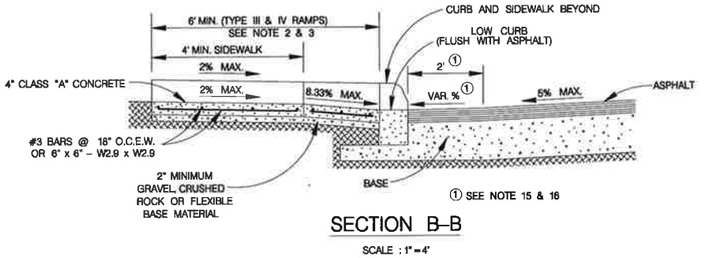
SECTION D–D

CURB PROFILE WHERE SIDEWALK IS SEPARATED FROM CURB
SCALE : 1" = 4'



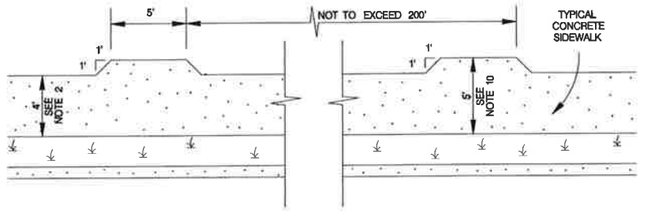
SECTION A–A

SCALE : 1" = 4'



SECTION B–B

SCALE : 1" = 4'



SIDEWALK PASSING SPACE

SCALE : 1" = 10'

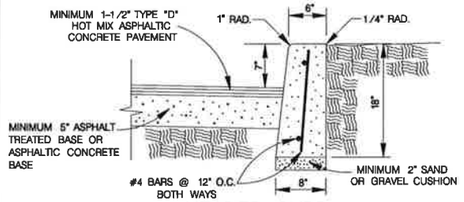
TABLE 1 (SEE NOTE 4)		
GUTTER SLOPE	SIDEWALK RAMP LENGTH (1:12)	
	LOW SIDE	HIGH SIDE
1%	5'–6"	7'–2"
2%	5'–0"	8'–4"
3%	4'–6"	10'–0"
4%	4'–2"	12'–6"
5%	3'–10"	16'–8"

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

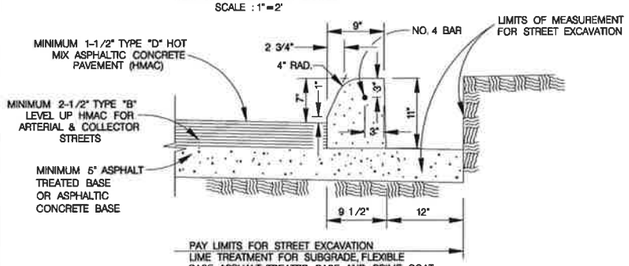
WHEELCHAIR RAMP STANDARDS

____% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.: ___OF___



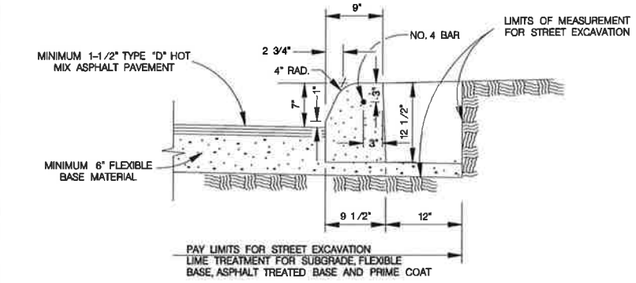
HEADER CURB

ITEM 500 ON SAND OR GRAVEL
SCALE : 1"=2'



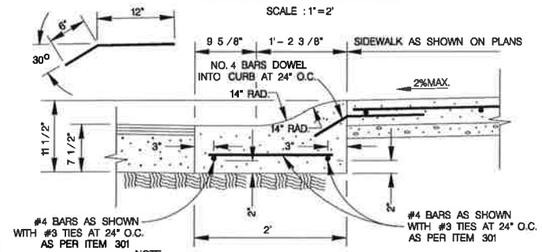
CONCRETE CURB

ITEM 500 ON ASPHALT TREATED BASE OR ASPHALTIC CONCRETE BASE
SCALE : 1"=2'



CONCRETE CURB

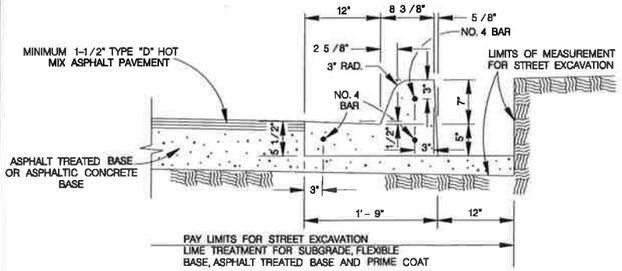
ITEM 500 ON FLEXIBLE BASE MATERIAL
SCALE : 1"=2'



NOTE:
CURB TRANSITIONS SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN ITEM 500 CONCRETE CURBING

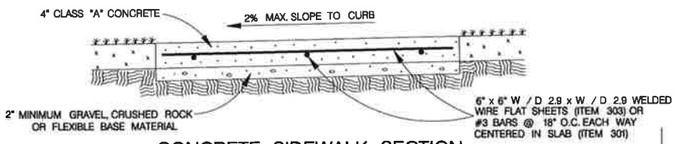
MOUNTABLE CURB

ITEM 500 ON COMPACTED SUBGRADE
SCALE : 1"=2'



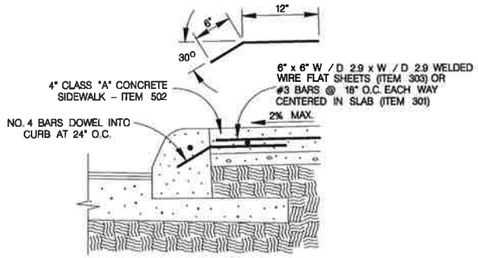
TYPICAL CURB & GUTTER DETAIL

ITEM 500 ON ASPHALT TREATED BASE OR ASPHALTIC CONCRETE BASE
SCALE : 1"=2'



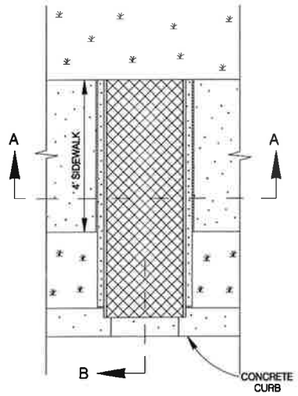
CONCRETE SIDEWALK SECTION

ITEM 502
SCALE : 1"=2'



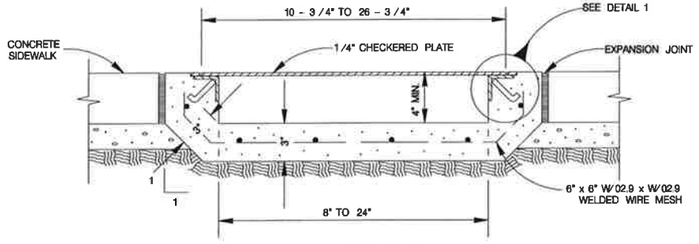
CONCRETE SIDEWALK ABUTTING CURB SECTION

ITEM 502
SCALE : 1"=2'



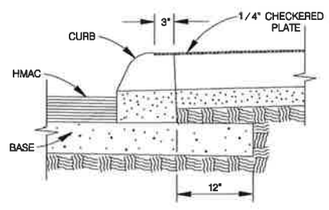
CONCRETE SIDEWALK DRAIN DETAIL

SCALE : 1"=4'



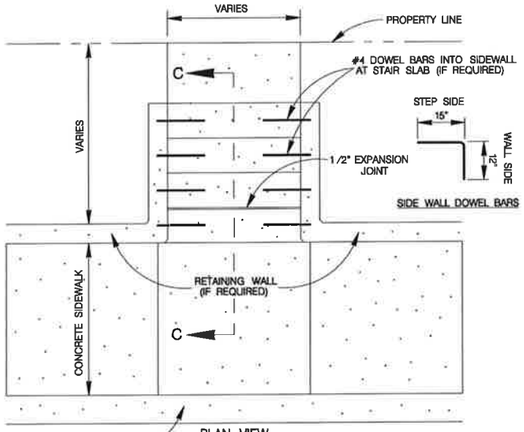
SECTION A–A

SCALE=1 : 12



SECTION B

SCALE : 1"=2'

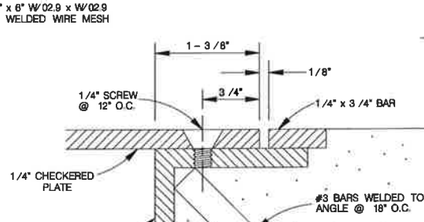


PLAN VIEW

SCALE : 1"=4'

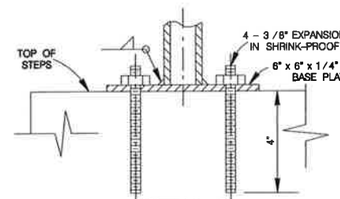
CONCRETE STEPS

ITEM 524



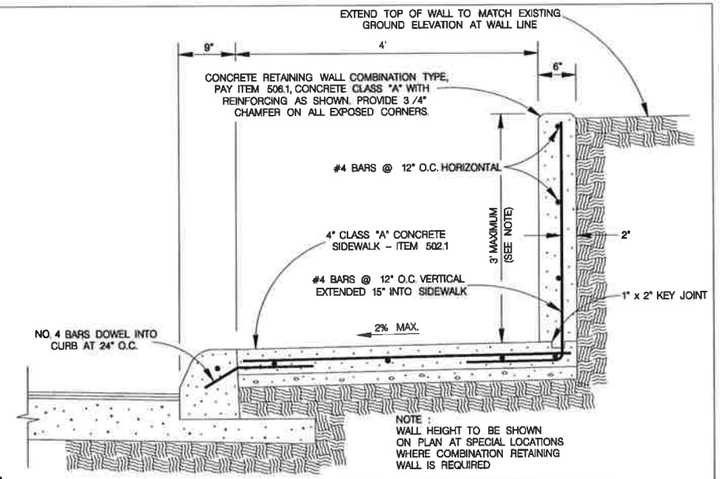
DETAIL 1

SCALE=1 : 1



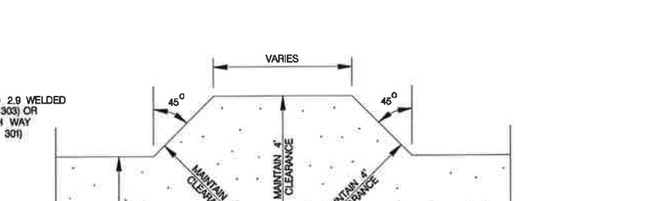
DETAIL 2

SCALE = 1 : 6



CONCRETE RETAINING WALL – COMBINATION TYPE

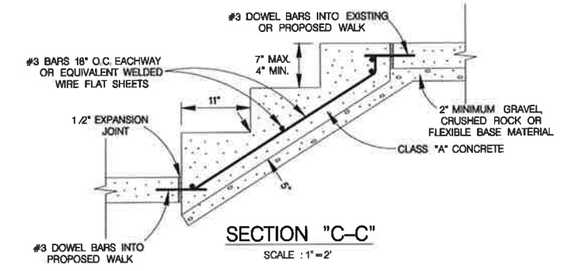
ITEM 506
SCALE : 1"=2'



NOTE :
THIS DETAIL TO BE USED WHENEVER A POWER POLE ENCROACHES ON SIDEWALK. A MINIMUM UNOBSTRUCTED CLEARANCE OF 4' IS TO BE MAINTAINED AROUND THE POLE AT THE LOCATIONS.

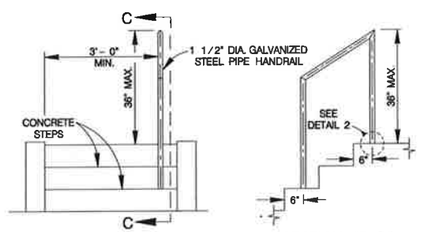
CONCRETE SIDEWALK @ UTILITY POWER POLE DETAIL

SCALE : 1"=4'



SECTION "C–C"

SCALE : 1"=2'



PIPE HANDRAIL DETAIL

PROFILE VIEW
SCALE : 1"=4'

SECTION "D–D"

FRONT VIEW
SCALE : 1"=4'

NOTES :
1. PLACE STEPS TO CONFORM WITH PROPOSED PARKWAY GRADING
2. 1-1/2" DIA. GALVANIZED STEEL PIPE HANDRAIL REQUIRED ON ONE SIDE OF THE STEPS WHEN 3 OR MORE RISERS ARE USED, OR AS DESIGNED BY ENGINEER. TO BE PAID UNDER ITEM 522

HANDRAIL FOR CONCRETE STEPS

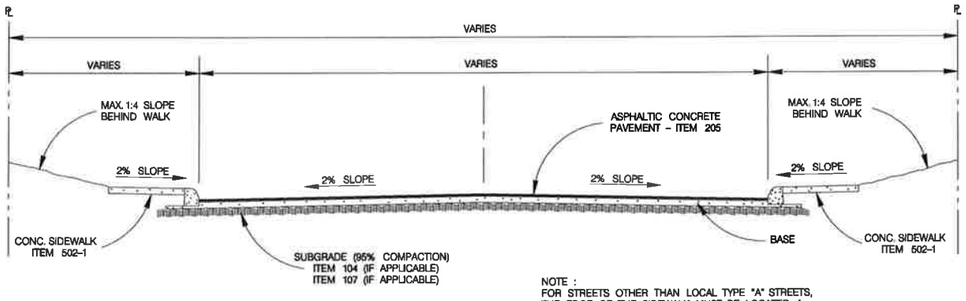
ITEM 522

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS CONSTRUCTION STANDARDS I

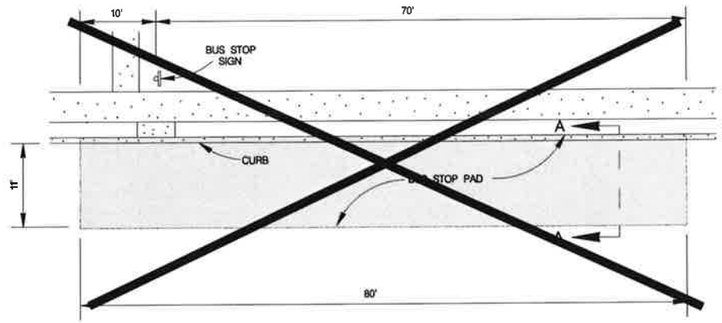
% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.: OF



NOTE :
FOR STREETS OTHER THAN LOCAL TYPE "A" STREETS, THE EDGE OF THE SIDEWALK MUST BE LOCATED A MINIMUM OF TWO FEET AWAY FROM THE BACK OF THE CURB.

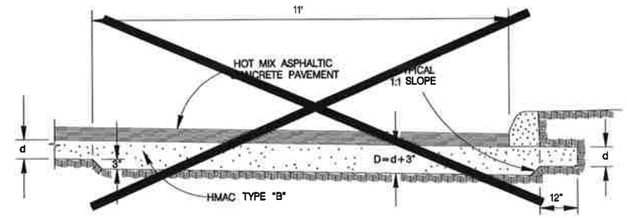
TYPICAL STREET SECTION

SCALE : 1" = 6'



PLAN VIEW

SCALE : 1" = 20'



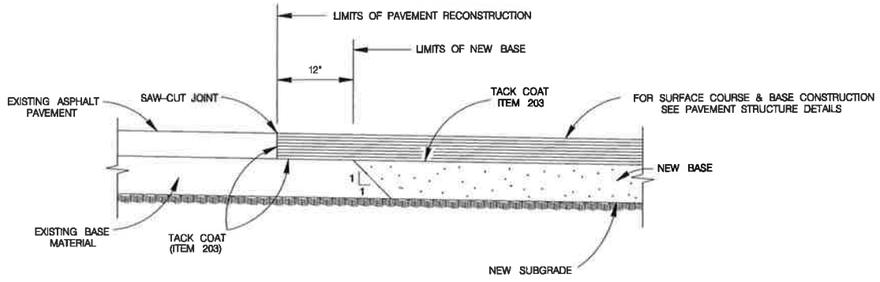
SECTION "A–A"

SCALE : 1" = 4'

NOTES :
1. EXCAVATION FOR THICKENED PAVEMENT SECTION WILL BE PAID UNDER ITEM NO. 104 "STREET EXCAVATION".
2. BASE MATERIALS :
   A.) IF THE MEASUREMENT FOR THE HMAC MATERIAL IS PER TON, THICKENED PAVEMENT SECTION WILL BE PAID FOR UNDER ITEM NO. 205, TYPE "B" PER TON.
   B.) IF THE MEASUREMENT FOR THE HMAC MATERIAL IS PER SQUARE YARD, NO EXTRA PAYMENT WILL BE MADE FOR THE THICKENED PAVEMENT.

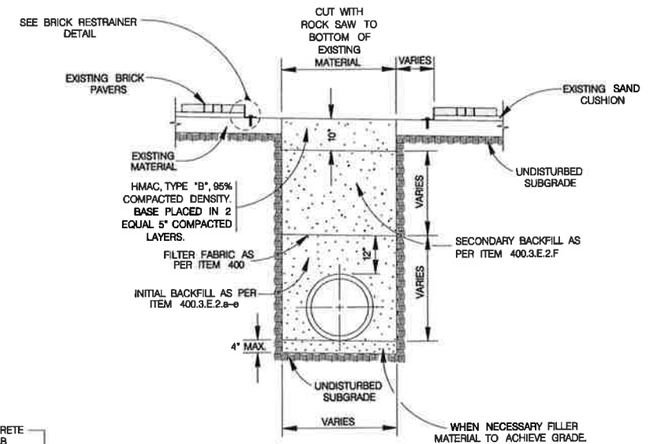
HMAC BUS STOP PAD

NEED CITY ENGINEER'S APPROVAL TO USE HMAC BUS PAD



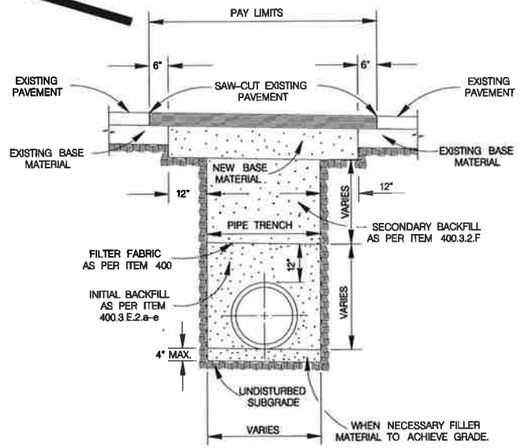
PAVEMENT JUNCTION DETAILS

SCALE : 1" = 2'



TYPICAL BASE REPLACEMENT FOR BRICK SURFACED STREET SECTION

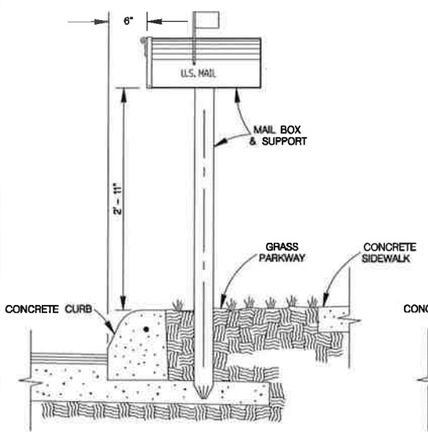
ITEM 511.3
SCALE : 1" = 4'



NOTES :
1. FOR LOCAL TYPE "A" & "B" STREETS (RESIDENTIAL) USE 6" ASPHALT CONCRETE BASE TYPE "B" WITH 1-1/2" TYPE "D" HOT MIX ASPHALTIC CONCRETE PAVEMENT.
2. FOR ARTERIAL & SECONDARY STREETS (COMMERCIAL) USE 12.5" TYPE "B" HOT MIX ASPHALTIC CONCRETE PAVEMENT LEVELING-UP COURSE & 1-1/2" TYPE "D" HOT MIX ASPHALTIC CONCRETE PAVEMENT SURFACE COURSE.

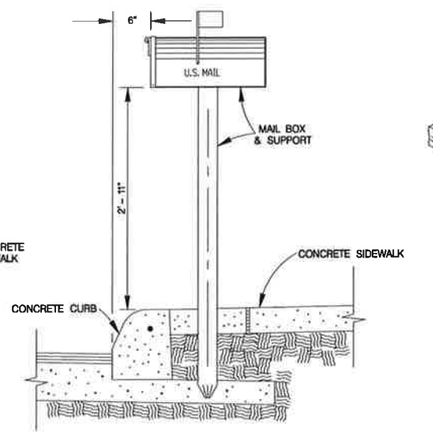
TYPICAL PAVEMENT REPLACEMENT

ITEM 511
SCALE : 1" = 4'



MAIL BOX PERPENDICULAR TO CURB

WHEN SIDEWALK IS DETACHED FROM CURB
SCALE : 1" = 2'

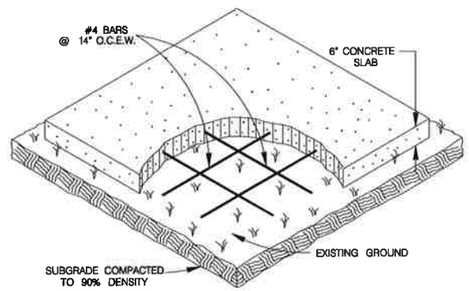


MAIL BOX PERPENDICULAR TO CURB

WHEN SIDEWALK IS ATTACHED TO CURB
SCALE : 1" = 2'

MAIL BOX LOCATION

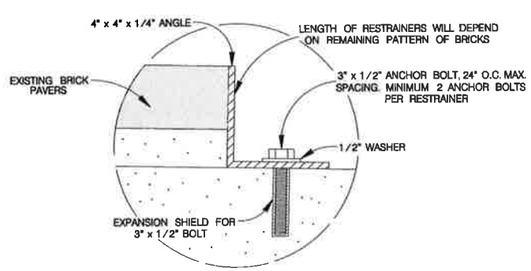
ITEM 513.1



MAIL BOX PAD NOTES :
1. THE CONTRACTOR WILL CONSTRUCT SLABS FOR "TEMPORARY MAIL BOX COLLECTION PAD" FOR THE UNITED STATES POSTAL SERVICE WITH LOCATIONS AND SIZES SPECIFIED BY THE CITY ENGINEER DURING CONSTRUCTION.
2. THE CONSTRUCTION OF SLABS SHALL CONFORM TO ITEM 513 "REMOVING AND RELOCATING MAILBOXES".
3. PAYMENT WILL BE MADE UNDER ITEM 513.2 "COMMUNITY MAILBOX SLAB – PER SQUARE YARD".
4. UNIT PRICE WILL INCLUDE REMOVAL OF "TEMPORARY MAIL BOX COLLECTION PAD" SLABS AT THE END OF THE PROJECT. NO SEPARATE PAY ITEM.

COMMUNITY MAIL BOX SLAB

ITEM 513.2
SCALE : 1" = 4'



BRICK RESTRAINER DETAIL

SCALE = 1 : 6

FEBRUARY 2010

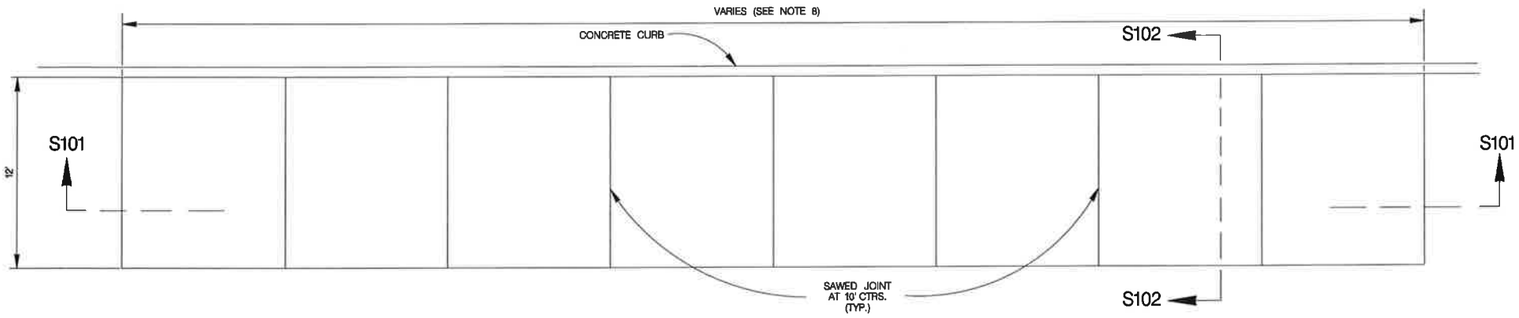
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS CONSTRUCTION STANDARDS II

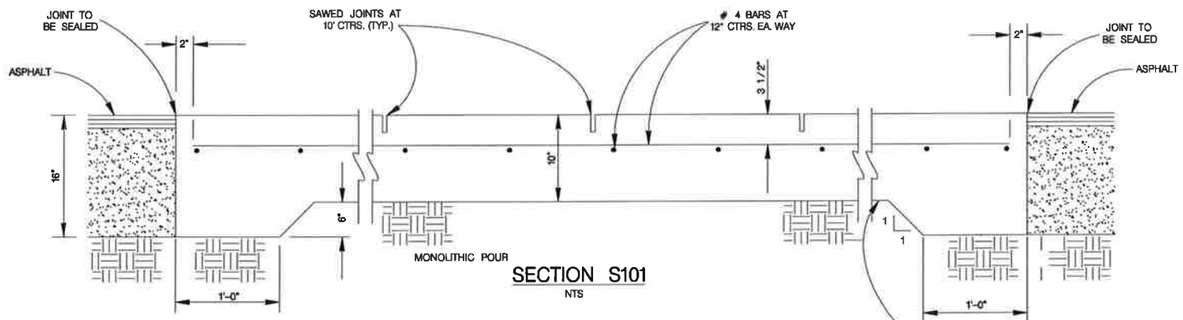
____% SUBMITTAL	PROJECT NO.:____		DATE:____
DRWN. BY: V. VASQUEZ	DSGN. BY:____	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.:____OF____

GENERAL NOTES

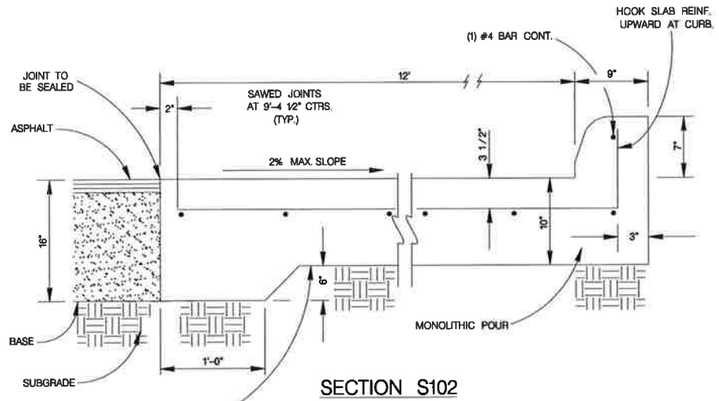
1. ALL CONCRETE SHALL TEST 4,000 P.S.I. AT 28 DAYS.
2. BUS STOP CONCRETE PAD CONSTRUCTION SHALL BE PAID UNDER ITEM 209 AT THE UNIT PRICE BID, WHICH PRICE SHALL BE FULL COMPENSATION FOR ALL DEMOLITION, REMOVAL OF EXISTING CURB, EXCAVATION, HAULING, CRUSHED LIMESTONE, REINFORCING STEEL, CONCRETE, CONCRETE CURB, JOINTS, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.
3. BUS PAD AND CURB SHALL BE MONOLITHICALLY POURED. ALL EXISTING CURBING SHALL BE REMOVED AND REPLACED AS PER STANDARD DETAILS.
4. THE CONTRACTOR SHALL CONSTRUCT AN EXPANSION JOINT MIDWAY IF THE "CONCRETE BUS STOP PAD" IS LONGER THAN 150 FEET. NO DIRECT PAYMENT SHALL BE MADE FOR CONSTRUCTION OF AN EXPANSION JOINT.
5. ACTUAL BUS PAD LENGTH AND WIDTH TO BE FIELD DETERMINED BY CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVE.
6. DO NOT DRIVE ON PAD UNTIL CONCRETE HAS REACHED A STRENGTH OF 2,800 P.S.I.
7. BREAK TEST CYLINDERS AS FOLLOWS:
   2 AT 3 DAYS
   2 AT 7 DAYS
   2 AT 28 DAYS
8. CONCRETE BUS PAD LENGTH (OR AS SHOWN ON THE PLANS):
   30 M.P.H. – 100'
   35 M.P.H. – 160'
   40 M.P.H. – 160'
   45 M.P.H. – 200'



PLAN VIEW
NTS

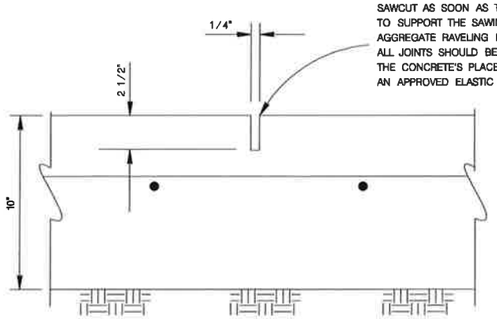


SECTION S101
NTS



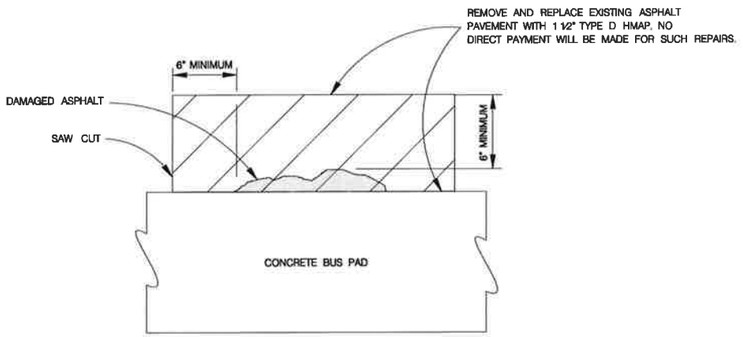
SECTION S102
NTS

PROOFROLL EXISTING SUBGRADE WITH BACKHOE OR SIMILAR EQUIPMENT TO LOCATE POTENTIAL SOFT REGIONS OF SUBGRADE . REPLACE SOFT AREAS WITH 12" OF SUITABLE MATERIAL.



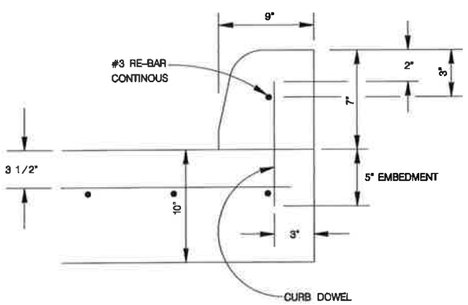
SAWCUT AS SOON AS THE CONCRETE IS STRONG ENOUGH TO SUPPORT THE SAWING EQUIPMENT AND TO PREVENT AGGREGATE RAVELING DURING THE SAWING OPERATION. ALL JOINTS SHOULD BE SAW CUT WITHIN 12 HOURS OF THE CONCRETE'S PLACEMENT. JOINTS SHALL BE FILLED WITH AN APPROVED ELASTIC TYPE MATERIAL AFTER SAW CUTTING.

SAWED JOINT DETAIL
NTS

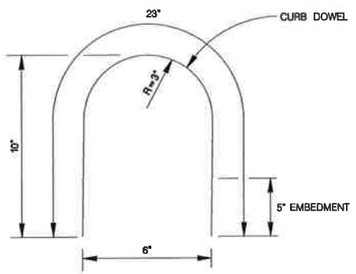


REMOVE AND REPLACE EXISTING ASPHALT PAVEMENT WITH 1 1/2" TYPE D HMAP. NO DIRECT PAYMENT WILL BE MADE FOR SUCH REPAIRS.

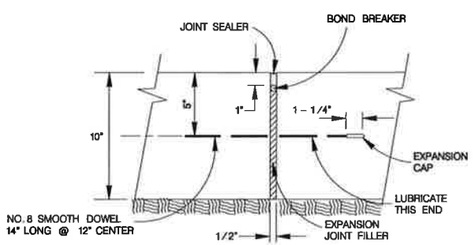
REPAIR OF DAMAGED ASPHALT
NTS



CONCRETE CURB OPTION
NEED CITY ENGINEER'S APPROVAL
NTS



CURB DOWEL
NO. 3 RE-BAR @ 30" C-C
NTS



NOTE:
THE CONTRACTOR SHALL CONSTRUCT AN EXPANSION JOINT MIDWAY IF THE "CONCRETE BUS STOP PAD" IS LONGER THAN 150 FEET. NO DIRECT PAYMENT SHALL BE MADE FOR CONSTRUCTION OF AN EXPANSION JOINT.

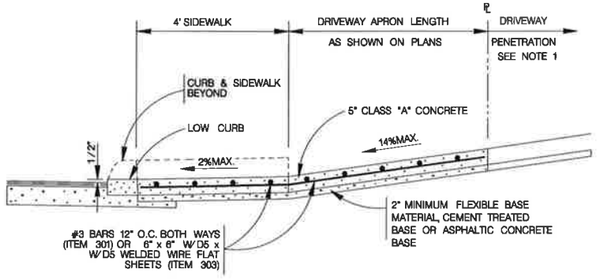
EXPANSION JOINT DETAIL
SCALE : 1" = 1'

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

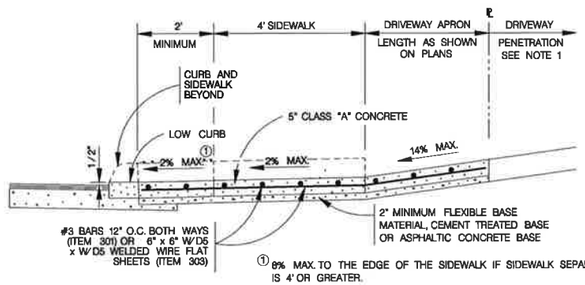
CONCRETE BUS STOP PAD

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY: L. MALTOS	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.: OF



TYPICAL RESIDENTIAL DRIVEWAY SECTION

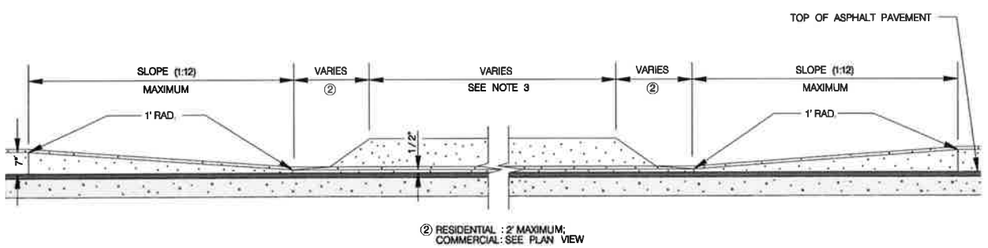
WITH SIDEWALK ABUTTING CURB
ITEM 503.1



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

TYPICAL RESIDENTIAL DRIVEWAY SECTION

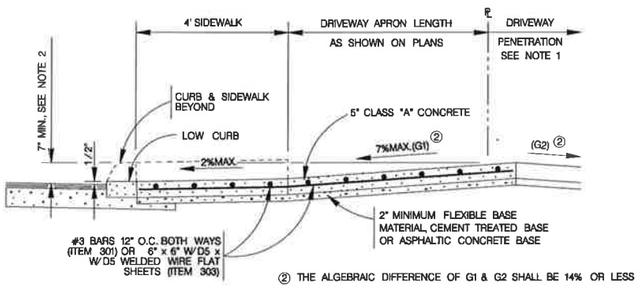
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.1



② RESIDENTIAL : 2' MAXIMUM; COMMERCIAL: SEE PLAN VIEW

CURB PROFILE AT DRIVEWAY

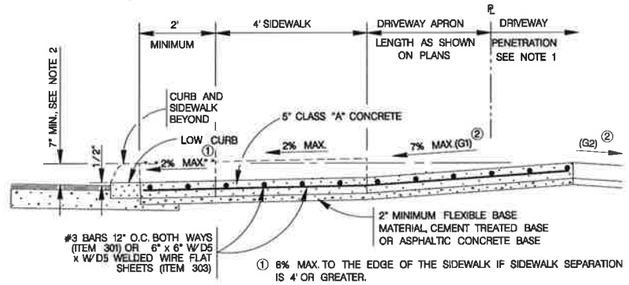
WITH SIDEWALK ABUTTING CURB



② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

TYPICAL RESIDENTIAL DRIVEWAY SECTION

WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS ABUTTING CURB
ITEM 503.1

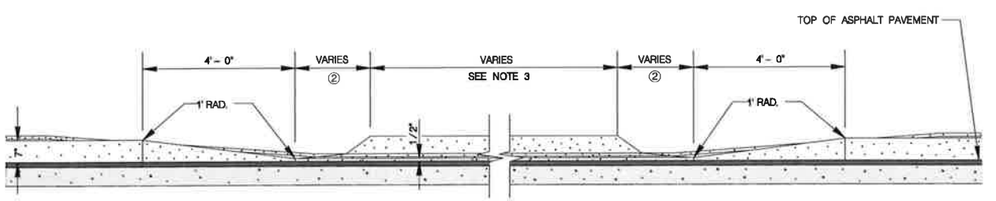


① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

TYPICAL RESIDENTIAL DRIVEWAY SECTION

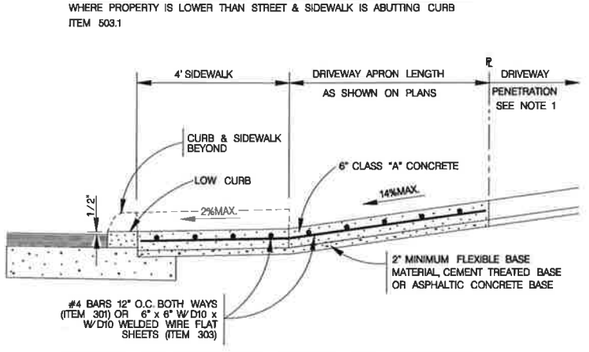
WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS SEPARATED FROM CURB
ITEM 503.1



② RESIDENTIAL : 2' MAXIMUM; COMMERCIAL: SEE PLAN VIEW

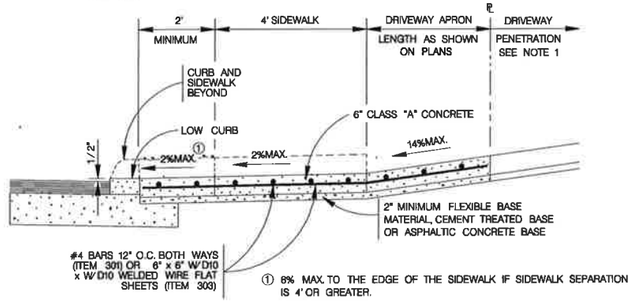
CURB PROFILE AT DRIVEWAY

WITH SIDEWALK SEPARATED FROM CURB



TYPICAL COMMERCIAL DRIVEWAY SECTION

WITH SIDEWALK ABUTTING CURB
ITEM 503.2



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

TYPICAL COMMERCIAL DRIVEWAY SECTION

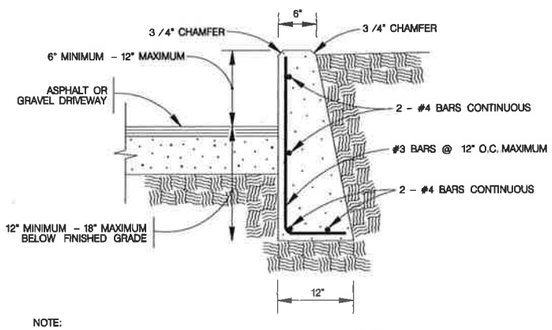
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.2

CONCRETE DRIVEWAY NOTES

1. DRIVEWAY PENETRATION REFERS TO A PORTION OF THE DRIVEWAY THAT MAY BE NECESSARY TO RECONSTRUCT WITHIN PRIVATE PROPERTY TO COMPLY WITH A MAXIMUM DRIVEWAY SLOPE. THIS PORTION OF THE DRIVEWAY SHALL BE PAID FOR UNDER THE FOLLOWING ITEMS AS MAY APPLY:
   A.) CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.1 OR 503.2.
   B.) ASPHALTIC CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.4 AND SHALL INCLUDE A MINIMUM OF 1" ASPHALT TYPE 'D' & 6" FLEXIBLE BASE
   C.) GRAVEL DRIVEWAY PAID FOR UNDER ITEM NO. 503.5 AND SHALL INCLUDE A MINIMUM OF 6" FLEXIBLE BASE
2. 7" MINIMUM HEIGHT WILL NOT NECESSARILY OCCUR AT THE PROPERTY LINE. IT MAY OCCUR WITHIN THE RIGHT OF WAY OR WITHIN THE DRIVEWAY PENETRATION ON PRIVATE PROPERTY.
3. THE PROPOSED DRIVEWAY SHOULD MATCH THE EXISTING WIDTH AT THE PROPERTY LINE BUT UNLESS AUTHORIZED BY THE CITY TRAFFIC ENGINEER, THE WIDTH SHALL BE WITHIN THE FOLLOWING VALUES:

TYPE	MINIMUM	MAXIMUM
RESIDENTIAL	10'	20'
COMMERCIAL – ONE WAY	12'	20'
COMMERCIAL – TWO WAY	24'	30'

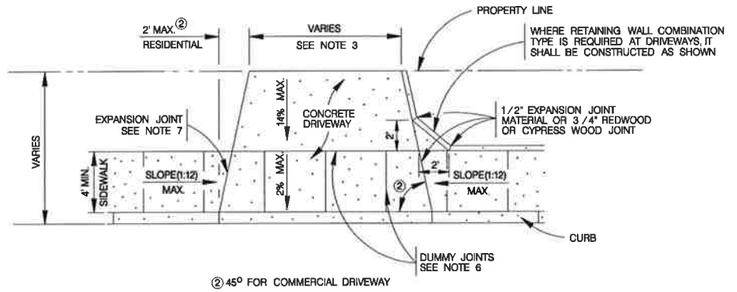
4. FOR LOCAL TYPE "A" STREETS, SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 2' FROM THE BACK OF CURB.
5. FOR OTHER THAN LOCAL TYPE "A" STREETS, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND SEPARATED A MINIMUM OF 2' FROM THE BACK OF CURB OR, AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
6. DUMMY JOINTS PARALLEL TO THE CURB SHALL BE PLACED WHERE THE SIDEWALK MEETS THE DRIVEWAY. DUMMY JOINTS PERPENDICULAR TO THE CURB, AND WITHIN THE BOUNDARIES OF THE PARALLEL DUMMY JOINTS, SHALL BE PLACED AT INTERVALS EQUAL TO THE WIDTH OF THE SIDEWALK.
7. A MINIMUM OF TWO ROUND AND SMOOTH DOWEL BARS 3 /8" IN DIAMETER AND 18" IN LENGTH SHALL BE SPACED 18" APART AT EACH EXPANSION JOINT.
8. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE. WHERE SIDEWALKS CROSS DRIVEWAYS, SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2%.
9. SIDEWALK RAMP SURFACE SHALL BE BRUSH FINISHED.



NOTE:
1. COST OF REINFORCEMENT TO BE INCLUDED IN UNIT COST OF ITEM 307.1.
2. CONCRETE RETAINING WALL COMBINATION TYPE SHALL BE USED FOR CONCRETE DRIVEWAYS.

DRIVEWAY – CONCRETE RETAINING WALL

ON COMPACTED SUBGRADE
ITEM 307.1



② 45° FOR COMMERCIAL DRIVEWAY

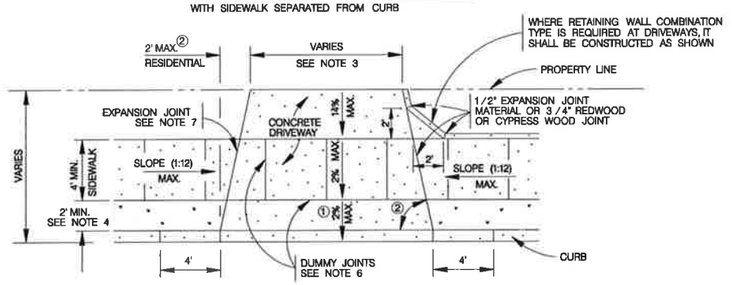
TYPICAL DRIVEWAY PLAN VIEW

WITH SIDEWALK ABUTTING CURB

② RESIDENTIAL : 2' MAXIMUM; COMMERCIAL: SEE PLAN VIEW

CURB PROFILE AT DRIVEWAY

WITH SIDEWALK SEPARATED FROM CURB



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

② 45° FOR COMMERCIAL DRIVEWAY

TYPICAL DRIVEWAY PLAN VIEW

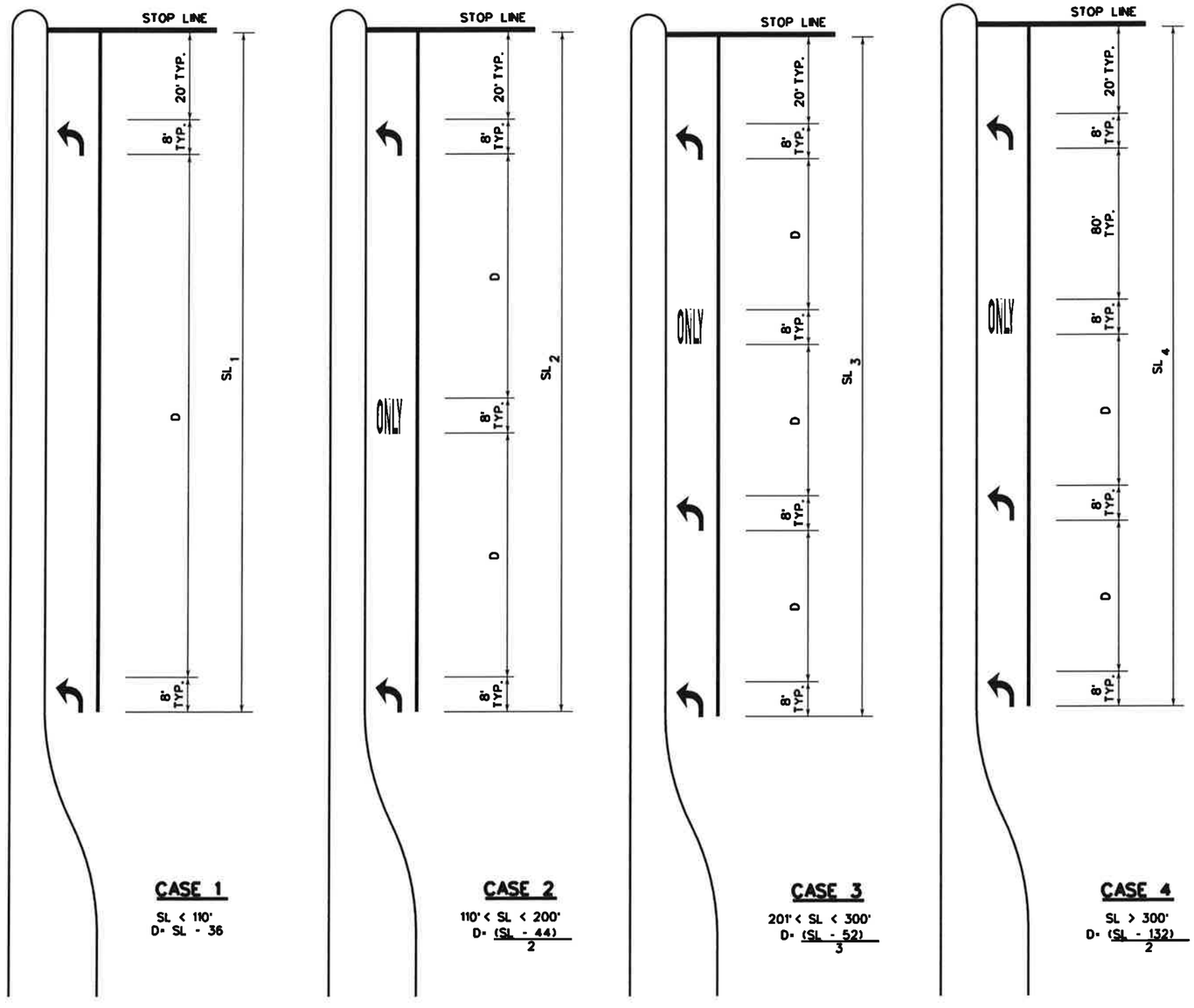
WITH SIDEWALK SEPARATED FROM CURB

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CONCRETE DRIVEWAY STANDARDS

____% SUBMITTAL	PROJECT NO.:_____	DATE:_____
DRWN. BY: V. VASQUEZ	DSGN. BY:_____ CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.:____OF____



CASE 1

SL < 110'
D= SL - 36

CASE 2

110' < SL < 200'
$D = \frac{(SL - 44)}{2}$

CASE 3

201' < SL < 300'
$D = \frac{(SL - 52)}{3}$

CASE 4

SL > 300'
$D = \frac{(SL - 132)}{2}$

KEY:

SL - STORAGE LENGTH (FEET)

D - DISTANCE BETWEEN ARROWS AND LEGENDS (FEET)

GENERAL NOTES:

1. THESE DETAILS ALSO APPLY TO RIGHT-TURN LANES.
2. FOR DUAL-TURN LANES, DIMENSIONS SHALL BE THE SAME FOR EACH LANE.
3. SL DIMENSION IS FROM STOP LINE TO END OF TURN LANE, WHICH DOES NOT INCLUDE TAPER LENGTH.
4. PAVEMENT ARROWS AND "ONLY" LEGEND MARKINGS ARE TYPICALLY USED AT SIGNALIZED INTERSECTIONS AND AT UNSIGNALIZED INTERSECTIONS WHERE A DEMONSTRATED NEED EXISTS.
5. MINIMUM SL = 110'. SL MAY BE LESS THAN 110 FEET AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET

SHEET 1 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: OF

SEPTEMBER 2009

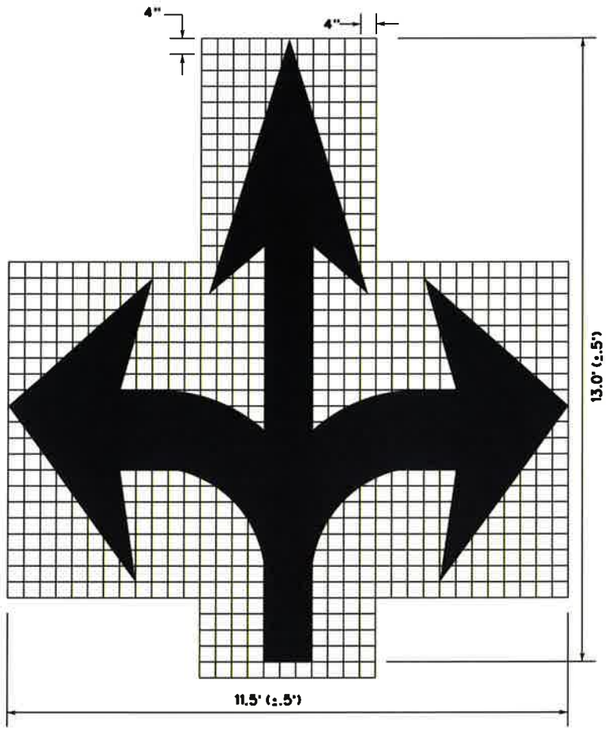
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

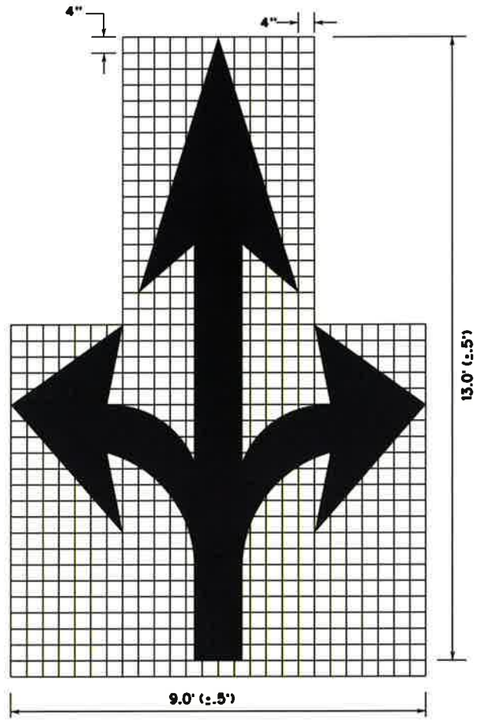
TRAFFIC ENGINEERING STANDARDS

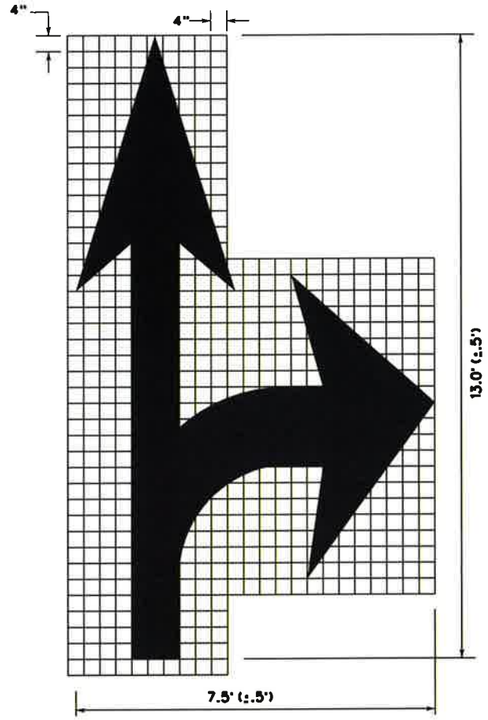
STANDARD PAVEMENT MARKINGS (WORDS)

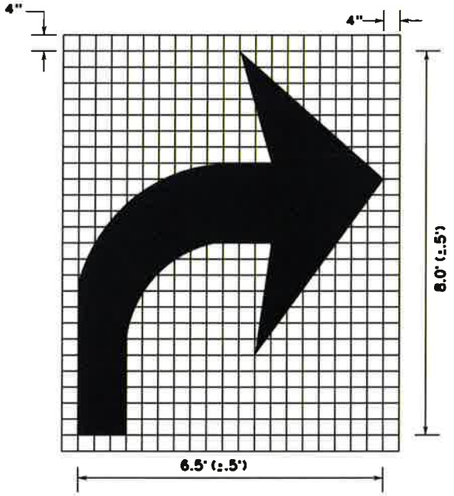
SHEET 2 OF 16

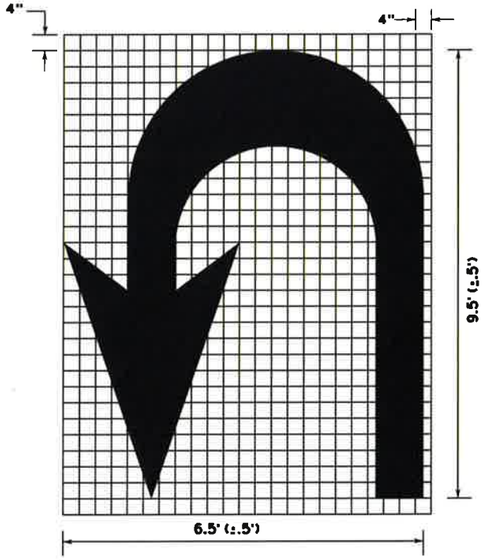
% SUBMITTAL	PROJECT NO:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

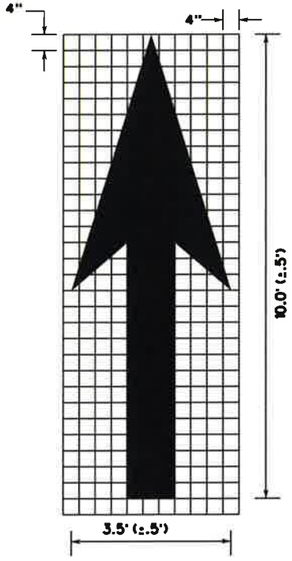


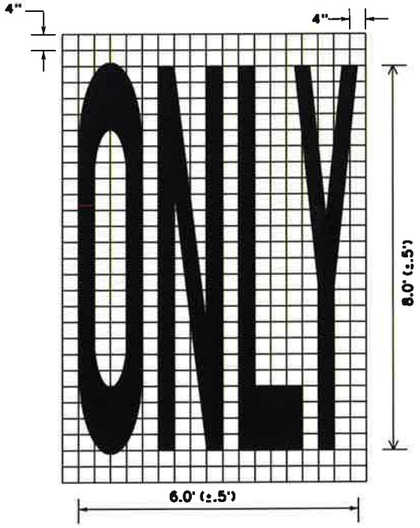












NOTES:

1. MINIMUM 8 FOOT WHITE MARKINGS SHALL BE USED, UNLESS OTHERWISE NOTED. IF MESSAGE CONSISTS OF MORE THAN ONE WORD, IT SHOULD BE PLACED WITH FIRST WORD NEAREST THE DRIVER.

2. THESE DETAILS ARE STANDARD SIZE FOR NORMAL INSTALLATION; SIZES MAY BE REDUCED APPROXIMATELY ONE-THIRD DEPENDING ON CONDITIONS.

3. THE LONGITUDINAL SPACE BETWEEN MARKINGS SHOULD BE 30 FEET.

4. MARKINGS CONSIDERED APPROPRIATE FOR USE WHEN WARRANTED INCLUDE THE FOLLOWING:

   A. REGULATORY
      STOP
      RIGHT (LEFT) TURN ONLY
      25 MPH
      SYMBOL ARROWS
   B. WARNING
      STOP AHEAD
      SIGNAL AHEAD
      SCHOOL
      SCHOOL X-ING
      PED X-ING
      R X R (SEE RCPM DETAIL)
      OTHER WORDS OR SYMBOLS MAY BE NECESSARY UNDER CERTAIN CONDITIONS

5. UNCONTROLLED USE OF PAVEMENT MARKINGS CAN RESULT IN DRIVER CONFUSION. WORD AND SYMBOL MARKINGS SHOULD BE NO MORE THAN THREE LINES.

6. THE WORD "STOP" SHALL NOT BE USED ON THE PAVEMENT UNLESS ACCOMPANIED BY A STOP LINE AND STOP SIGN. THE WORD "STOP" SHALL NOT BE PLACED ON THE PAVEMENT IN ADVANCE TO A STOP LINE, UNLESS EVERY VEHICLE IS REQUIRED TO STOP AT ALL TIMES.

7. PAVEMENT MARKINGS SHOULD GENERALLY BE NO MORE THAN ONE LANE IN WIDTH, WITH SCHOOL MESSAGES BEING THE EXCEPTION. FOR DETAILS OF SCHOOL AND SCHOOL CROSSING PAVEMENT MARKINGS, REFER TO PART VII OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

8. SPACING BETWEEN LETTERS SHOULD BE APPROXIMATELY 4 INCHES. THE WIDTH OF LETTERS MAY VARY DEPENDING ON THE WIDTH OF THE TRAVEL LANES.

9. LANE-USE ARROW MARKINGS MAY BE USED TO CONVEY EITHER GUIDANCE OR MANDATORY MESSAGES. ARROWS USED TO CONVEY A MANDATORY MOVEMENT MUST BE ACCOMPANIED BY STANDARD SIGNS AND THE PAVEMENT MARKING WORD "ONLY".

10. PAVEMENT MARKINGS ARE TO BE LOCATED AS SPECIFIED ELSEWHERE IN THE PLANS.

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CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

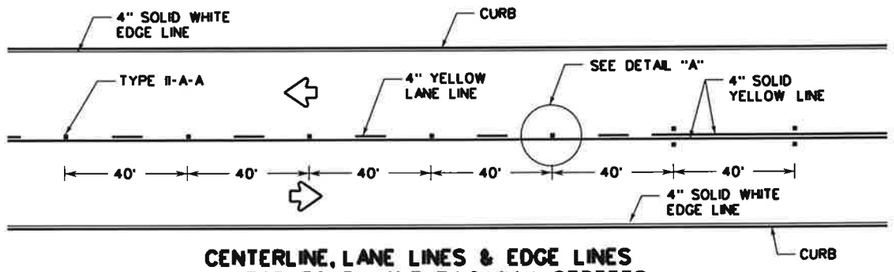
TRAFFIC ENGINEERING STANDARDS

STANDARD PAVEMENT MARKINGS (ARROWS)

SHEET 3 OF 16

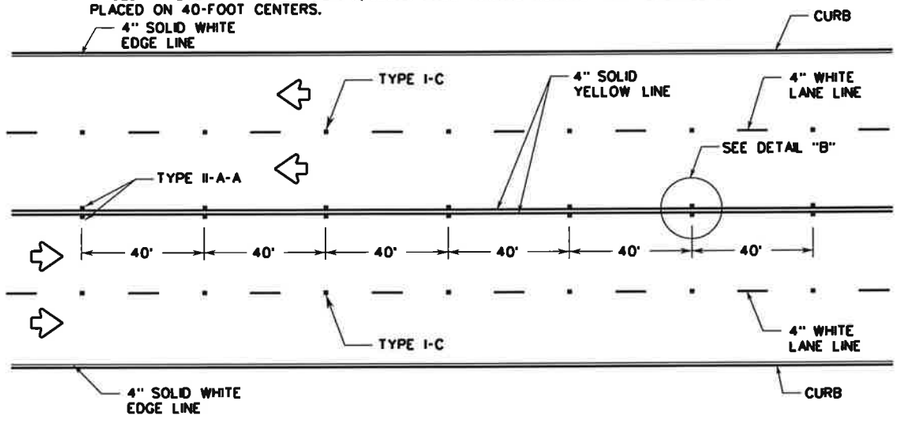
% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

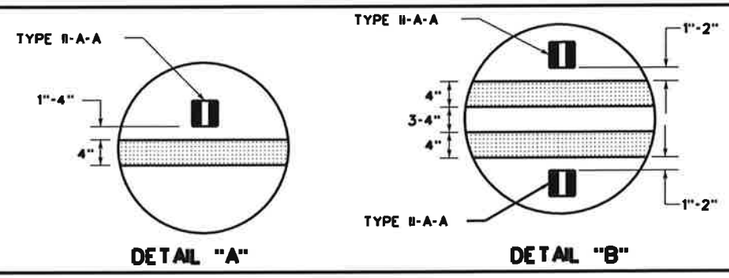
CENTERLINE & EDGE FOR ALL TWO LANE STREETS WITH PASSING ZONE



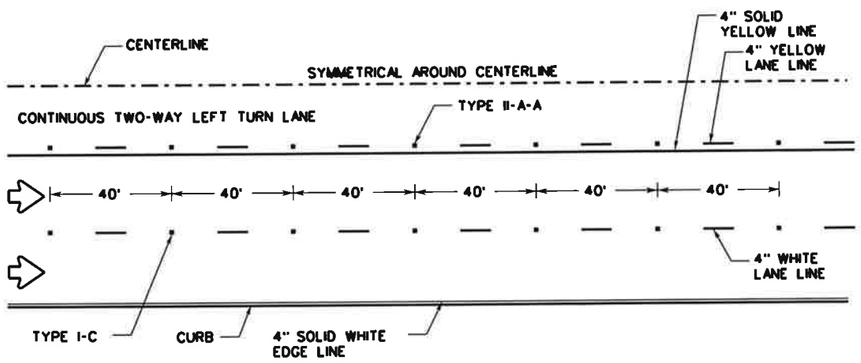
CENTERLINE, LANE LINES & EDGE LINES FOR FOUR LANE TWO-WAY STREETS

RAISED PAVEMENT MARKER TYPE I-C, CLEAR FACE TOWARD NORMAL TRAFFIC, SHALL BE PLACED ON 40-FOOT CENTERS.





CENTERLINE, LANE LINES, & EDGE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES & EDGE LINES FOR ONE-WAY MULTILANE STREET

RAISED PAVEMENT MARKERS TYPE II-C-R SHALL HAVE CLEAR FACE TOWARD NORMAL TRAFFIC AND RED FACE TOWARD WRONG-WAY TRAFFIC.

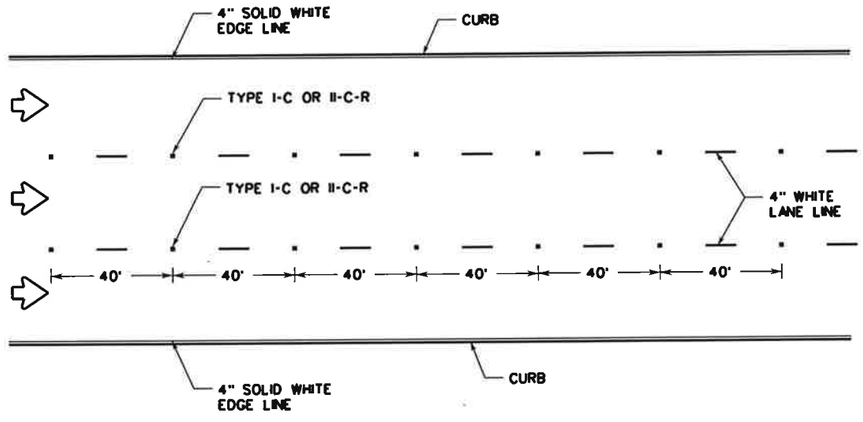


TABLE 1 - TYPICAL LENGTH (L)

• POSTED SPEED	FORMULA
45>	L• $\frac{WS^2}{60}$
≥45	L• WS

* 85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT. CROSSHATCHING LENGTH SHOULD BE ROUNDED UP TO NEAREST 5 FOOT INCREMENT.

L• LENGTH OF CROSSHATCHING (FT)
W• WIDTH OF OFFSET (FT)
S• POSTED SPEED (MPH)

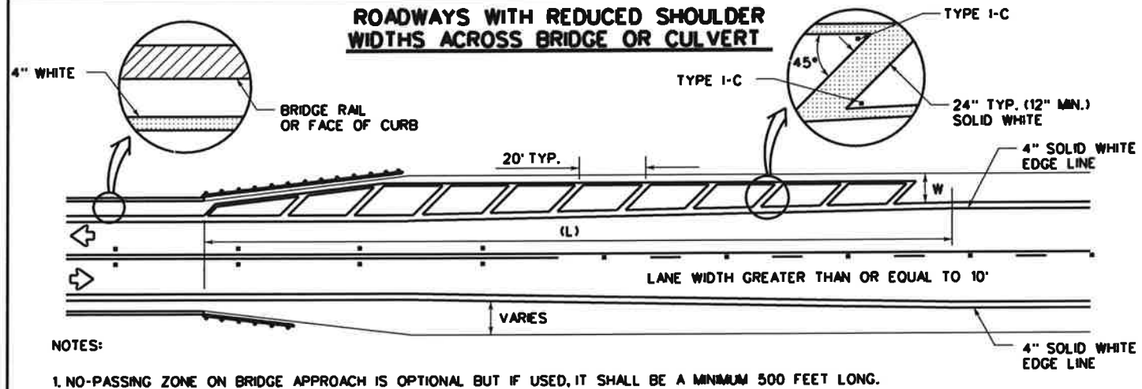
EXAMPLES:
AN 8 FOOT SHOULDER IN ADVANCE OF A BRIDGE REDUCES TO 4 FEET ON A 70 MPH ROADWAY. THE LENGTH OF THE CROSS-HATCHING SHOULD BE:
L•8X70•560 FT
A 4 FOOT SHOULDER IN ADVANCE OF A BRIDGE REDUCES TO 2 FEET ON A 40 MPH ROADWAY. THE LENGTH OF THE CROSS-HATCHING SHOULD BE:
L• 4(40)² / 60• 106.67 FT ROUNDED TO 110 FT

YIELD LINES

GENERAL NOTES:

1. EDGELINE ADJACENT TO CURB AND GUTTER IS NOT REQUIRED IN ALL CASES, HOWEVER SHALL BE PLACED AS DIRECTED BY CITY TRAFFIC ENGINEER.
2. THE TRAVELED WAY INCLUDES ONLY THAT PORTION OF THE ROADWAY USED FOR VEHICULAR TRAVEL AND NOT THE PARKING LANES, SIDEWALKS, BERMS AND SHOULDERS. THE TRAVELED WAYS SHALL BE MEASURED FROM THE INSIDE OF EDGELINE TO INSIDE OF EDGELINE OF A TWO LANE ROADWAY.
3. ALL RAISED PAVEMENT MARKERS PLACED IN BROKEN LINES SHALL BE PLACED IN LINE WITH AND MIDWAY BETWEEN THE STRIPES.
4. ON CONCRETE PAVEMENTS THE RAISED PAVEMENT MARKERS SHOULD BE PLACED TO ONE SIDE OF THE LONGITUDINAL JOINTS.
5. ALL PAVEMENT MARKING MATERIAL SHALL MEET THE REQUIRED MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. 4" SOLID WHITE EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

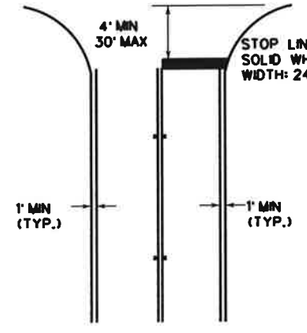
ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT



NOTES:

1. NO-PASSING ZONE ON BRIDGE APPROACH IS OPTIONAL BUT IF USED, IT SHALL BE A MINIMUM 500 FEET LONG.
2. FOR CROSSHATCHING LENGTH (L) SEE TABLE 1.
3. THE WIDTH OF THE OFFSET (W) AND THE REQUIRED CROSSHATCHING WIDTH IS THE FULL SHOULDER WIDTH IN ADVANCE OF THE BRIDGE.
4. THE CROSSHATCHING SHOULD BE REQUIRED IF THE SHOULDER WIDTH IN ADVANCE OF THE BRIDGE IS 4 FOOT OR WIDER AND ANY REDUCTION IN SHOULDER WIDTH ACROSS THE BRIDGE OCCURS.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE



SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

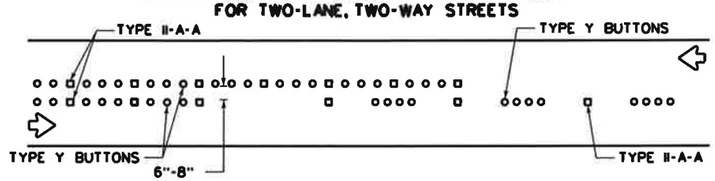
TRAFFIC ENGINEERING STANDARDS
STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE 1
SHEET 4 OF 16

% SUBMITTAL	PROJECT NO.:			DATE:	
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.		SHEET NO.:	OF:

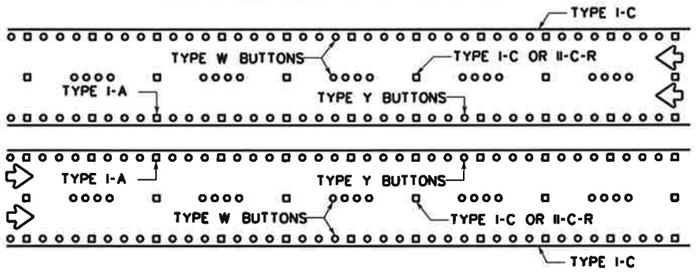
RAISED PAVEMENT MARKING PLACEMENT PATTERNS

PLACED W/ REFLECTION PAVEMENT MARKERS (OPTIONAL)

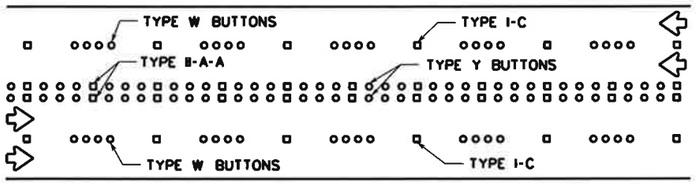
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY STREETS



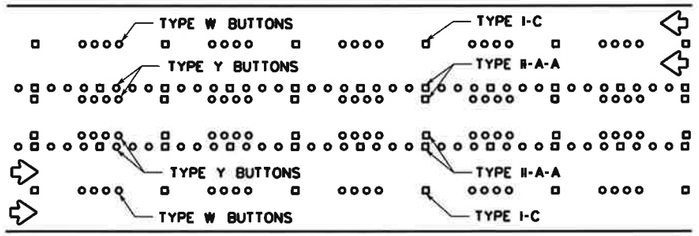
EDGE & LANE LINES FOR DIVIDED STREET



LANE & CENTER LINES FOR MULTILANE UNDIVIDED STREETS

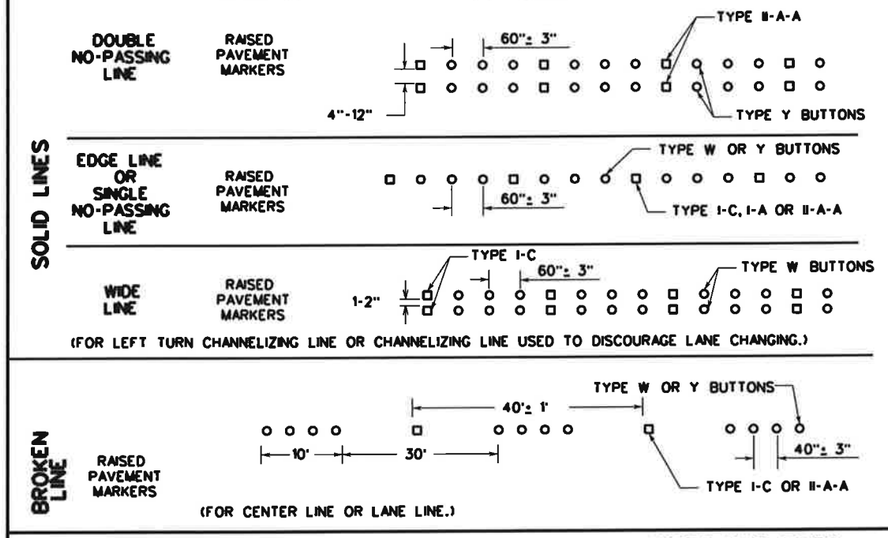


TWO-WAY LEFT TURN LANE



RAISED PAVEMENT MARKINGS PLACEMENT DETAILS

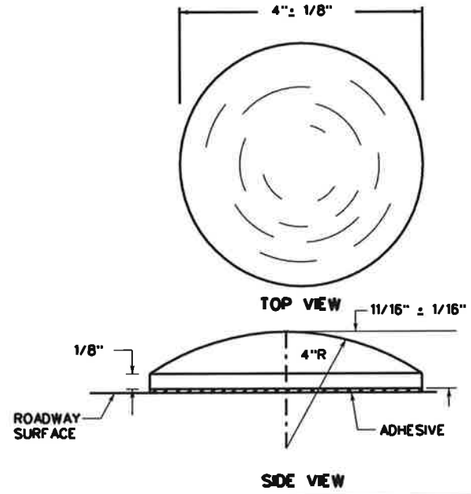
PLACED W/ REFLECTION PAVEMENT MARKERS (OPTIONAL)



TRAFFIC BUTTONS

(NON-REFLECTORIZED)

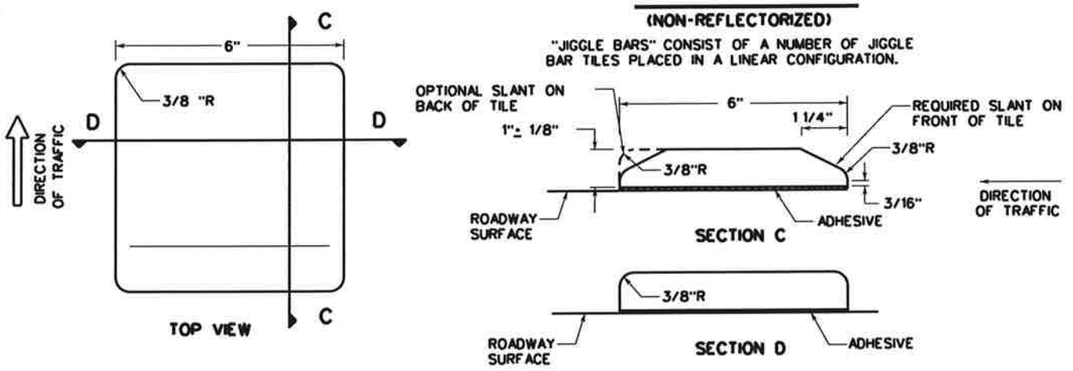
NOTE: MINIMUM AREA OF MARKERS SHALL BE NOT LESS THAN 12.5 SQUARE INCHES.



JIGGLE BAR TILES

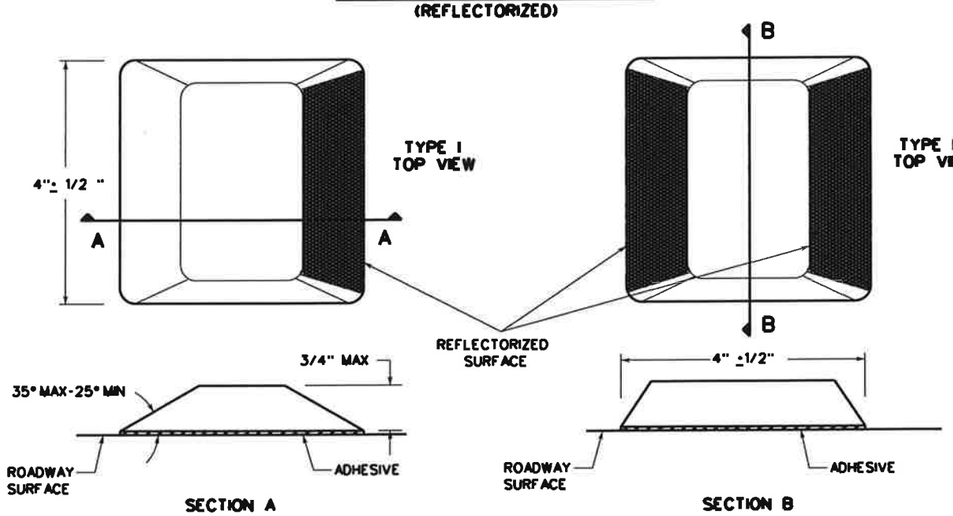
(NON-REFLECTORIZED)

"JIGGLE BARS" CONSIST OF A NUMBER OF JIGGLE BAR TILES PLACED IN A LINEAR CONFIGURATION.



RAISED PAVEMENT MARKERS

(REFLECTORIZED)



NOTES:

1. RAISED PAVEMENT MARKERS (RPMs) MAY CONSIST OF TRAFFIC BUTTONS, PAVEMENT MARKERS AND/OR JIGGLE BAR TILES. PAVEMENT SURFACE SHALL BE PREPARED AND CLEANED SUBJECT TO APPROVAL OF THE CITY TRAFFIC ENGINEER BEFORE ADHESIVE AND RPMs ARE PLACED.
2. JIGGLE BARS SHALL BE ORIENTED PERPENDICULAR TO ROADWAY. JIGGLE BARS SHALL ALSO BE PLACED AT SUCH OTHER LOCATIONS AS SHOWN IN PLANS OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
3. MARKERS, BUTTONS AND JIGGLE BAR TILES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND NOT INTENDED TO SPECIFY ANY PARTICULAR PRODUCT. ALL PAVEMENT MARKERS PROVIDED SHALL BE OF THE SAME MANUFACTURER.
4. ALL DIMENSIONS ARE -/- 1/8" UNLESS OTHERWISE NOTED.
5. ALL PAVEMENT MARKING MATERIALS SHALL MEET MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. TRAFFIC BUTTONS AND JIGGLE BAR TILES ARE TO BE USED ONLY FOR TEMPORARY TRAFFIC CONTROL OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

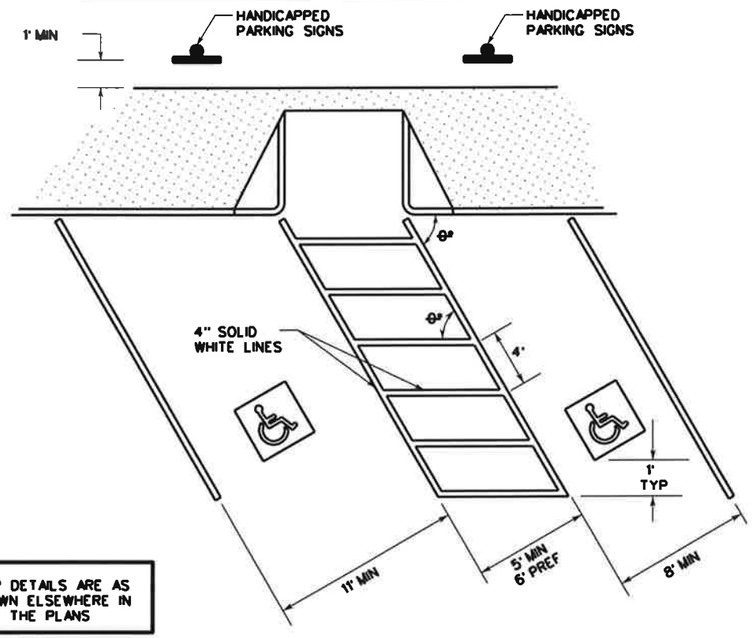
TRAFFIC ENGINEERING STANDARDS

RAISED PAVEMENT MARKERS, REFLECTIVE PAVEMENT MARKERS, TRAFFIC BUTTONS & JIGGLE BAR TILES 2

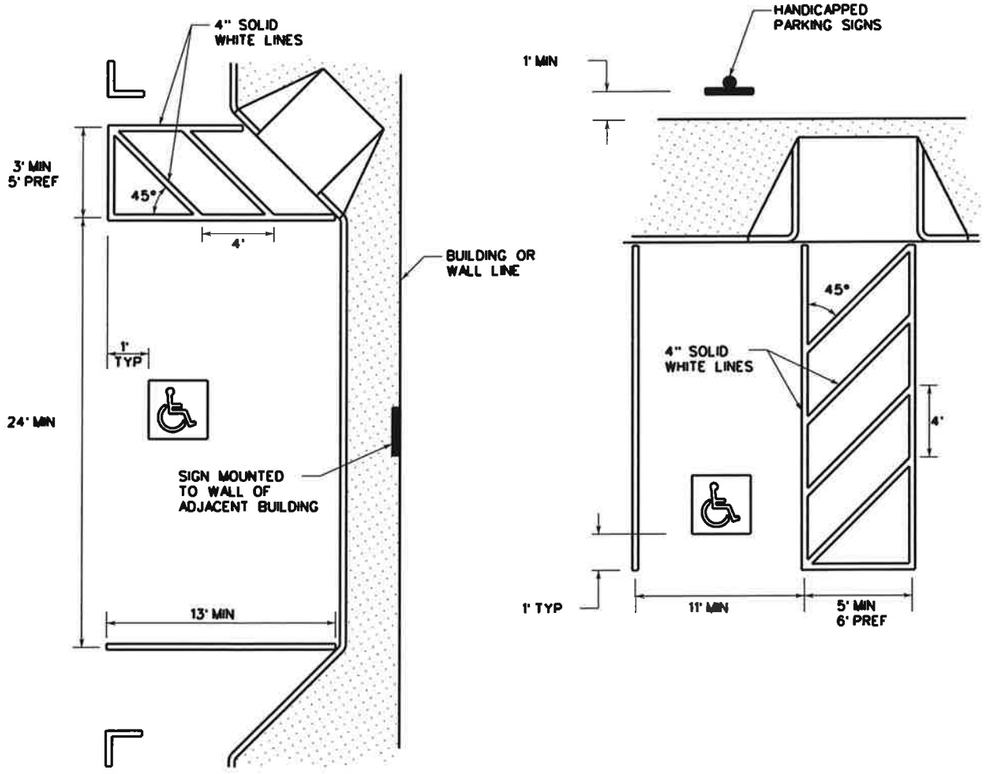
SHEET 5 OF 16

___ % SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: ___ OF ___

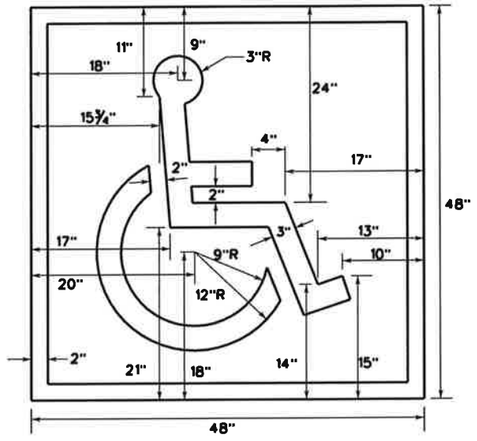
TYPICAL ACCESSIBLE PARKING SPACE DIMENSIONS



RAMP DETAILS ARE AS SHOWN ELSEWHERE IN THE PLANS

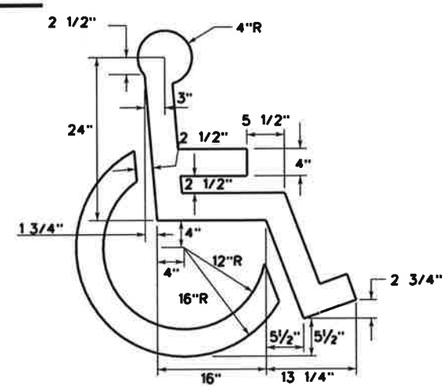


PAVEMENT MARKINGS



WITH BACKGROUND

SYMBOL & BORDER: WHITE
BACKGROUND: BLUE



SYMBOL ONLY

SYMBOL: BLUE OR WHITE

NOTES:

1. ALL PARKING SPACE LIMIT LINES SHALL BE 4" SOLID WHITE LINES.
2. AISLE MARKINGS SHOWN ARE EXAMPLES ONLY. OTHER METHODS TO INDICATE A NO PARKING AREA ARE ACCEPTABLE. AISLE MARKINGS SHALL BE WHITE.
3. DIMENSIONS OF LIMIT LINES, AISLE MARKINGS, AND SYMBOL (WITH OR WITHOUT BACKGROUND) MAY VARY ± 10%.
4. PAVEMENT MARKING SYMBOLS (WITH BACKGROUND):
   A) ARE REQUIRED UNLESS STATED ELSEWHERE IN THE PLANS,
   B) SHOULD BE PLACED TOWARD THE FAR END OF THE PARKING SPACES SO AS TO BE VISIBLE TO MOTORISTS IN THE TRAVEL LANE,
   C) MAY BE PAINTED OR PREFABRICATED MATERIAL, AND
   D) SHALL BE 30"x30" MINIMUM.
5. WITH APPROVAL OF THE CITY TRAFFIC ENGINEER, PREFABRICATED PAVEMENT MARKING SYMBOLS WITH BACKGROUND OF OTHER DIMENSIONS EXCEEDING THE 30"x30" MINIMUM MAY BE USED. ALTERNATIVE DESIGNS SHALL INCLUDE A PROPORTION SIZED SYMBOL OF ACCESSIBILITY, AND SHALL CONFORM TO THE ILLUSTRATED COLORS FOR BACKGROUND, SYMBOL AND BORDER.
6. ALL SLOPE IN AND AROUND EXPECTED WHEEL CHAIR PATH SHALL NOT EXCEED 2% X-SLOPES.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

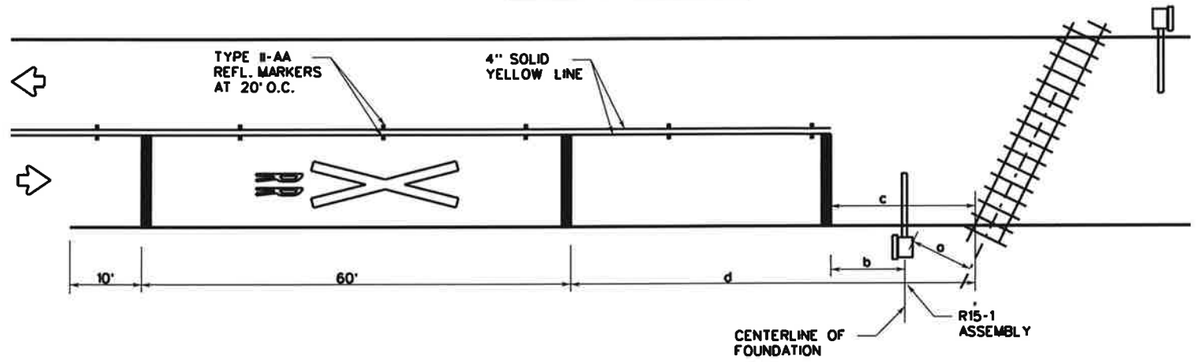
TRAFFIC ENGINEERING STANDARDS

PAVEMENT MARKINGS FOR ACCESSIBLE PARKING

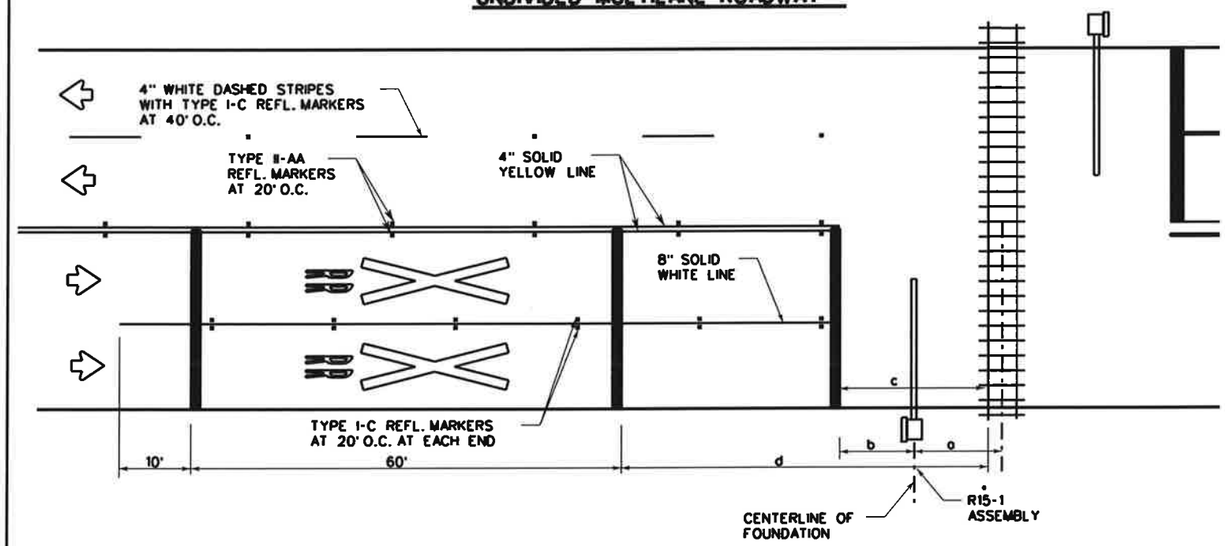
SHEET 6 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

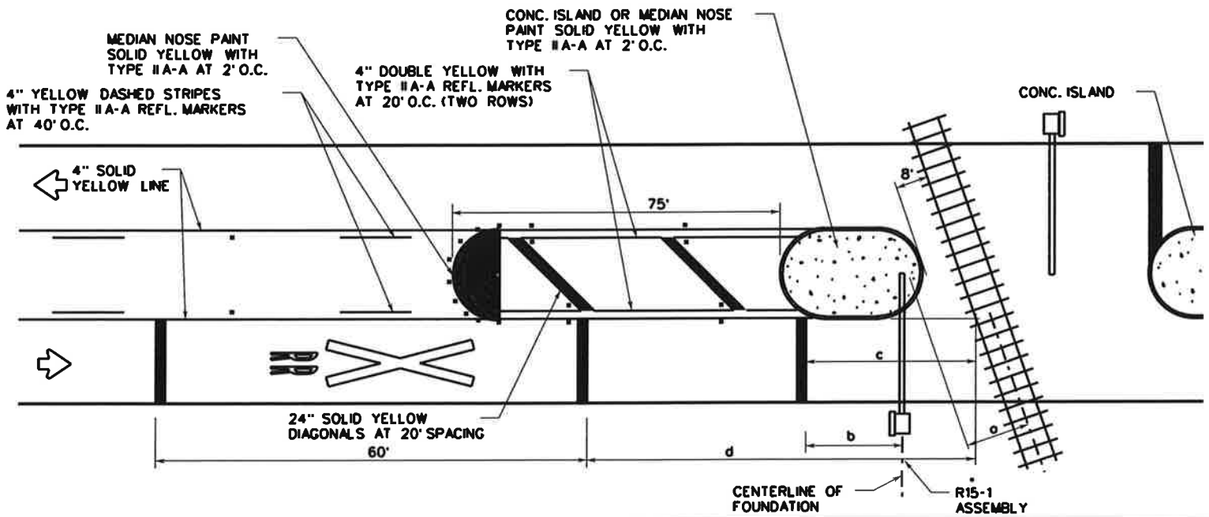
TWO LANE, TWO-WAY



UNDIVIDED MULTILANE ROADWAY



TWO-WAY LEFT-TURN LANE (TWLTL)



a = 12 FEET MINIMUM, 15 FEET USUAL, IF ACTIVE WARNING DEVICES ARE PRESENT. DISTANCE "a" SHOULD BE MEASURED FROM THE CENTERLINE OF R15-1 ASSEMBLY TO THE CENTERLINE OF NEAREST TRACK.

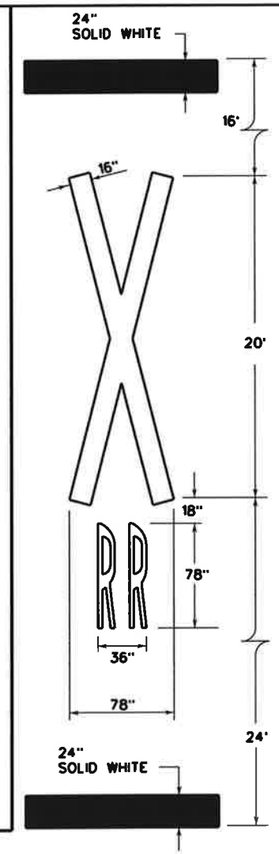
b = STOP LINES SHOULD BE APPROXIMATELY 8 FEET IN ADVANCE OF ACTIVE WARNING DEVICES (TYPE A, E OR F). STOP LINE SHOULD BE APPROXIMATELY 15 FEET FROM NEAR RAIL IF ONLY PASSIVE DEVICES (R15-1, PLUS R15-2 WHEN APPLICABLE) ARE PRESENT.

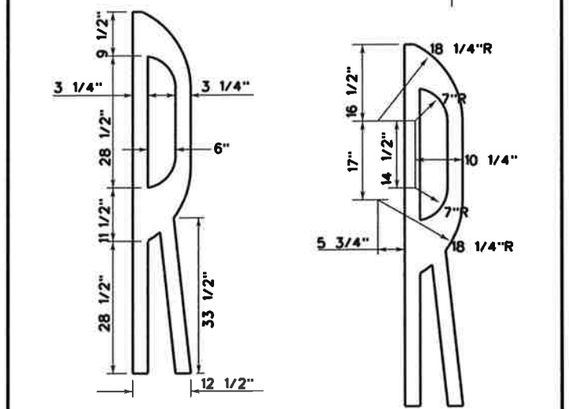
c = 15 FEET DESIRABLE MINIMUM IF NO GATE OR SIGNAL IS PRESENT. R15-1 SHOULD BE PLACED BETWEEN STOP LINE AND RAILS WITH ADEQUATE DISTANCE PROVIDED FOR "a".

d* =

APPROACH SPEED (MPH)	DESIRABLE PLACEMENT (FEET)
20	145
25	220
30	295
35	370
40	445
45	520
50	595
55	670
60	745
65	820
70	900

* LOCAL CONDITIONS MAY REQUIRE ALTERNATE PLACEMENT LOCATIONS.





R15-1 ASSEMBLY

MAY CONSIST OF ONE OR MORE OF THE FOLLOWING:

R15-1 CROSSBUCK SIGN
R15-2 MULTIPLE TRACK SIGN
TYPE A MAST FLASHERS
TYPE E CANTILEVERS
TYPE F GATES

NOTES:

1. THE PAVEMENT MARKINGS ON AN APPROACH TO A RAILROAD GRADE CROSSING SHALL CONSISTS OF:
   A) THE RR X-ING SYMBOL,
   B) THREE TRANSVERSE 24" LINES, AND
   C) LANE LINES: A SOLID NO PASSING LINE FOR TWO-WAY TRAFFIC APPROACHES, OR SOLID LAND LINES FOR MULTILANE APPROACHES.
2. FOR BIDDING PURPOSES, THE RR X-ING SYMBOL WILL BE MEASURED AND PAID FOR AS FOR EACH LANE IN PLACE. THE TRANSVERSE MARKINGS AND LANE LINES WILL BE MEASURED AND PAID FOR BY THE LINEAL FOOT.
3. CENTERLINES SHALL BE YELLOW, OTHER MARKINGS SHALL BE WHITE.
4. APPROACH LANES LESS THAN 8 FOOT WIDTH SHALL NOT HAVE MARKINGS.
5. MARKINGS SHOULD NOT BE PLACED WHERE LESS THAN 110 FEET OF APPROACH ROADWAY IS AVAILABLE FOR PLACEMENT UNLESS DIRECTED BY CITY TRAFFIC ENGINEER.
6. RR X-ING SYMBOLS SHOULD BE PLACED APPROXIMATELY IN THE CENTER OF THE APPROACH LANE.
7. ALL TRANSVERSE MARKINGS, INCLUDING STOP LINES, SHALL BE PLACED AT RIGHT ANGLES TO THE CENTERLINE AND ACROSS ALL APPROACH LANES.
8. EXISTING NON-STANDARD MARKINGS SHALL BE REMOVED TO THE FULLEST EXTENT POSSIBLE SO AS NOT TO LEAVE A DISCERNABLE MARKING, BY ANY METHOD APPROVED BY THE CITY TRAFFIC ENGINEER. OVERPAINTING WILL NOT BE ALLOWED.
9. ADDITIONAL MARKINGS AND PLACEMENT DETAILS MAY BE FOUND IN THE TMUTCD, APPENDIX H.
10. THE CITY TRAFFIC ENGINEER MAY REQUIRE ADDITIONAL LONGITUDINAL MARKINGS IF THE DISTANCE BETWEEN THE STOP LINES IS GREATER THAN 80 FEET. MARKINGS ARE NOT REQUIRED ACROSS OR BETWEEN THE RAILS UNLESS SPECIFIED ELSEWHERE IN THE PLANS.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

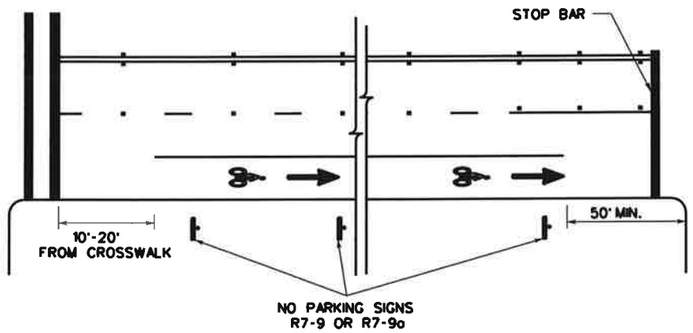
TRAFFIC ENGINEERING STANDARDS

RAILROAD CROSSING PAVEMENT MARKING (RCPM) DETAILS

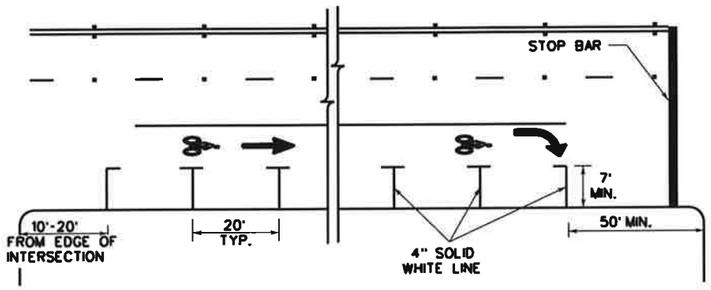
SHEET 7 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: OF

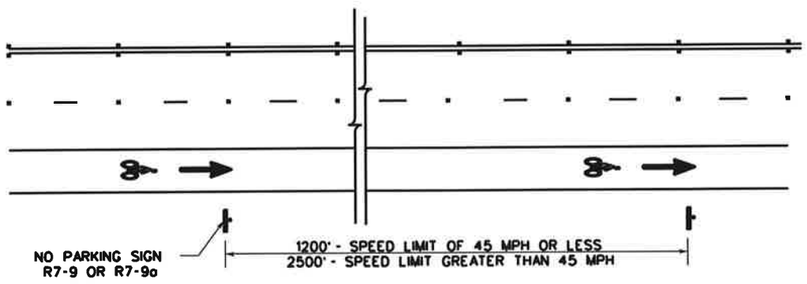
NO PARKING ALONG BICYCLE LANE

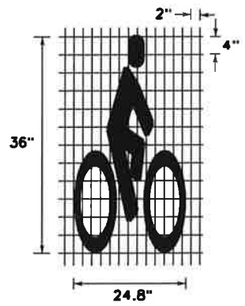


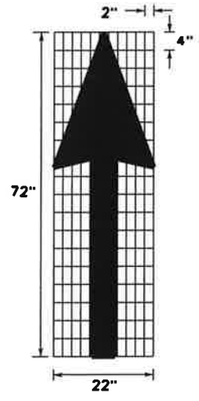
PARKING ALONG BICYCLE LANE

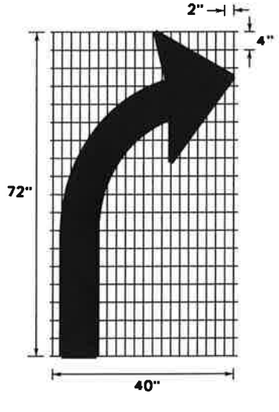


ROADWAYS WITH FEW INTERSECTIONS

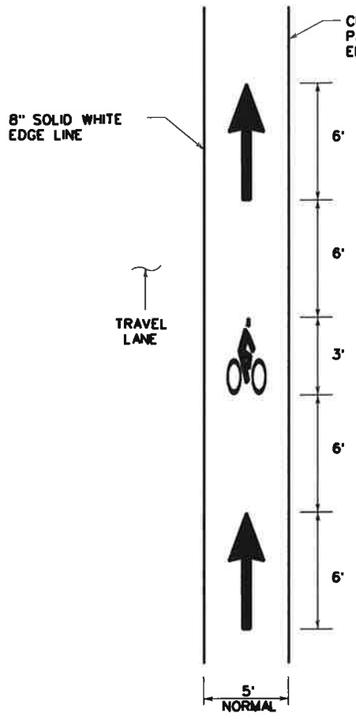






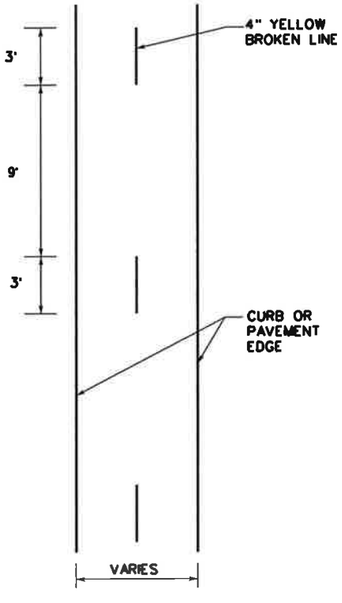


ADJACENT TO TRAVEL LANE

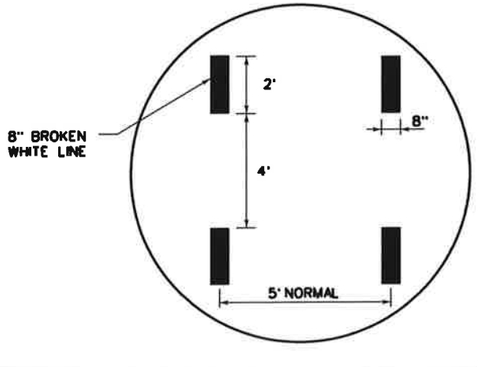


SHARED USE PATH

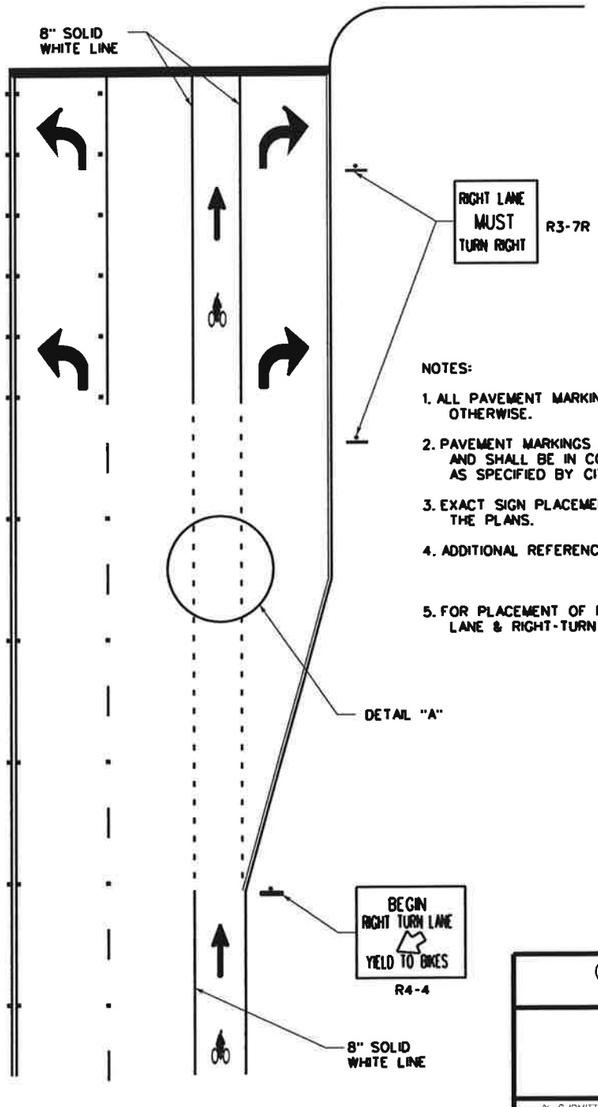
(SEPERATE FROM ROADWAY WITH NO MOTORIZED TRAFFIC)



DETAIL "A"



RIGHT-TURN LANE AT INTERSECTION



NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE WHITE EXCEPT WHEN NOTED OTHERWISE.
2. PAVEMENT MARKINGS SHALL BE OF THE MATERIALS SPECIFIED AND SHALL BE IN CONFORMANCE WITH MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
3. EXACT SIGN PLACEMENT AND DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.
4. ADDITIONAL REFERENCES: TMUTCD
   GUIDE FOR THE DEVELOPMENT OF BICYCLES FACILITIES, AASHTO, 1991.
5. FOR PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

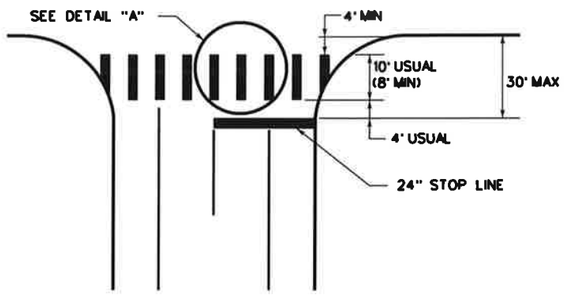
TRAFFIC ENGINEERING STANDARDS

BICYCLE LANE PAVEMENT MARKINGS

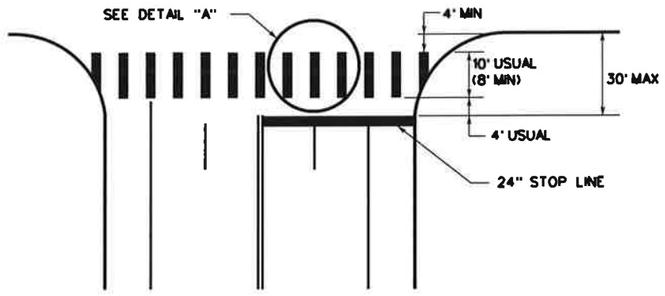
SHEET 8 OF 16

% SUBMITTAL	PROJECT NO.	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

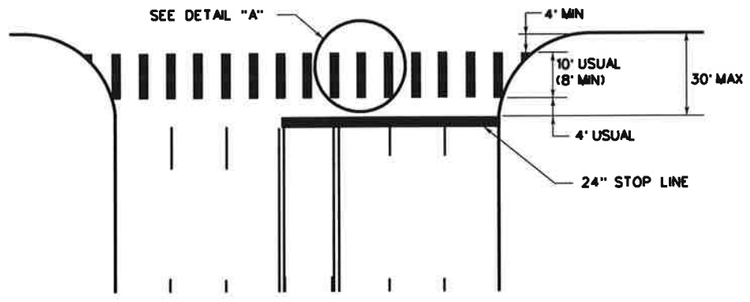
TWO LANES WITH SHOULDERS



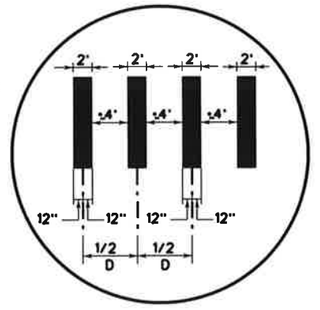
FOUR LANES WITH SHOULDERS



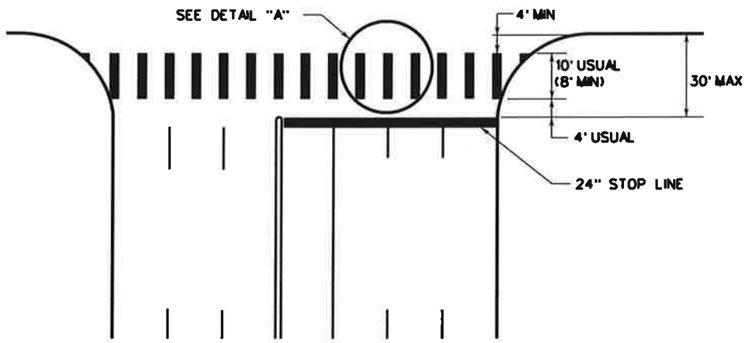
MULTI - LANES



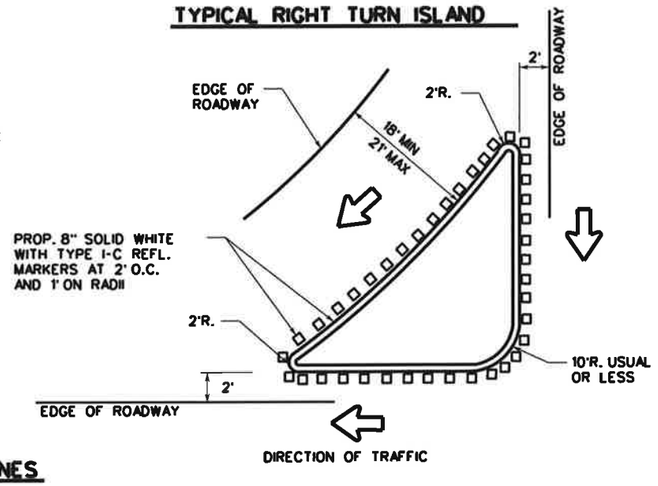
DETAIL "A"



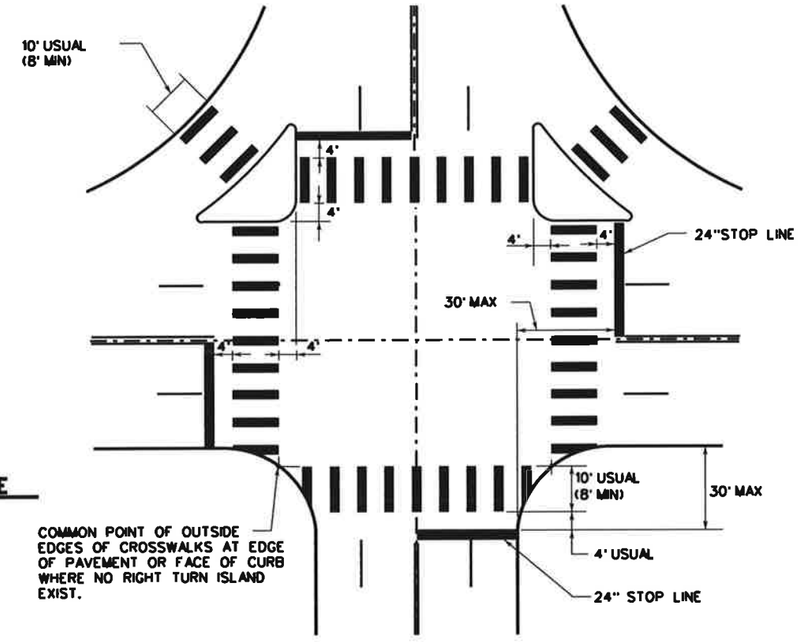
MULTI - LANE WITH MEDIAN



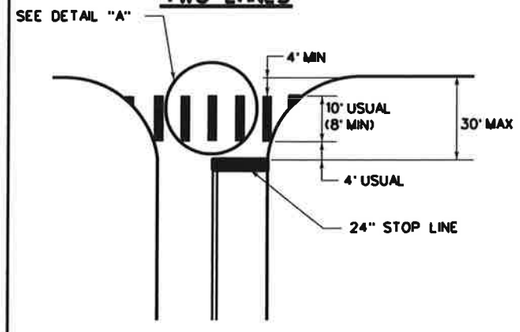
TYPICAL RIGHT TURN ISLAND



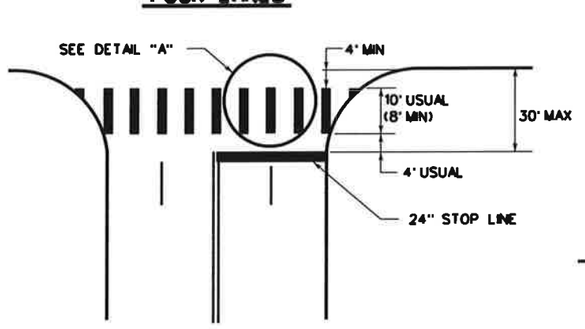
INTERSECTION WITH RIGHT - TURN ISLANDS



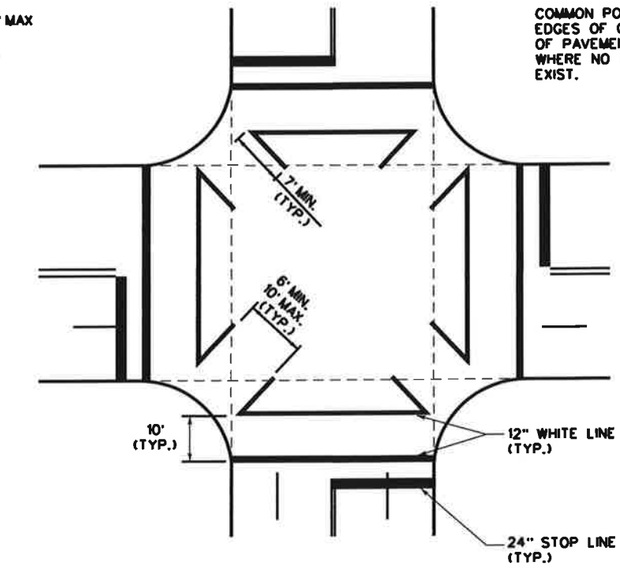
TWO LANES



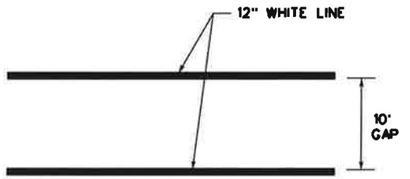
FOUR LANES



EXCLUSIVE PEDESTRIAN PHASE

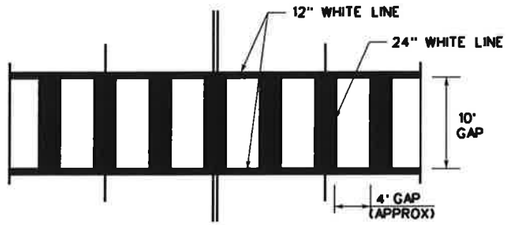


CENTRAL BUSINESS DISTRICT CROSSWALK DETAIL



HIGH VISIBILITY CROSSWALK DETAIL

TYPICALLY USED AT SIGNALIZED AND NON-SIGNALIZED MID-BLOCK CROSSINGS FOR COLLECTOR AND ARTERIAL ROADWAYS AND AT LOCATIONS REQUIRING EXTRA EMPHASIS.



NOTES:

1. CROSSWALKS AND STOP LINES SHALL BE WHITE.
2. "D" IS EQUAL TO ONE HALF THE WIDTH OF TRAVEL LANE.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

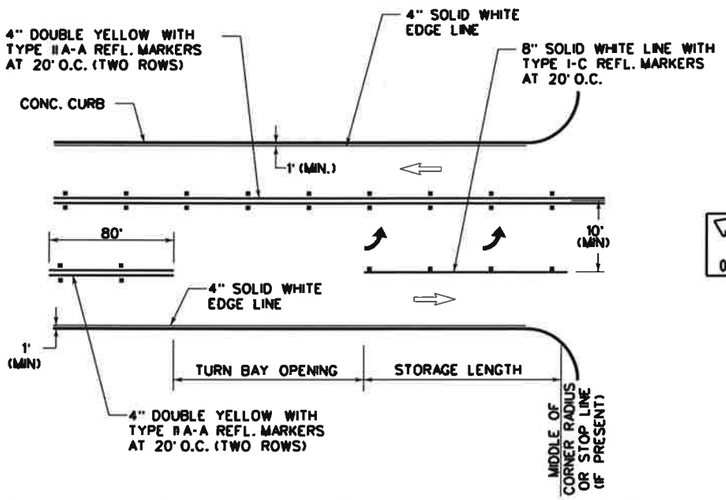
TRAFFIC ENGINEERING STANDARDS

TYPICAL CROSSWALK DETAILS

SHEET 9 OF 16

% SUBMITTAL	PROJECT NO.	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

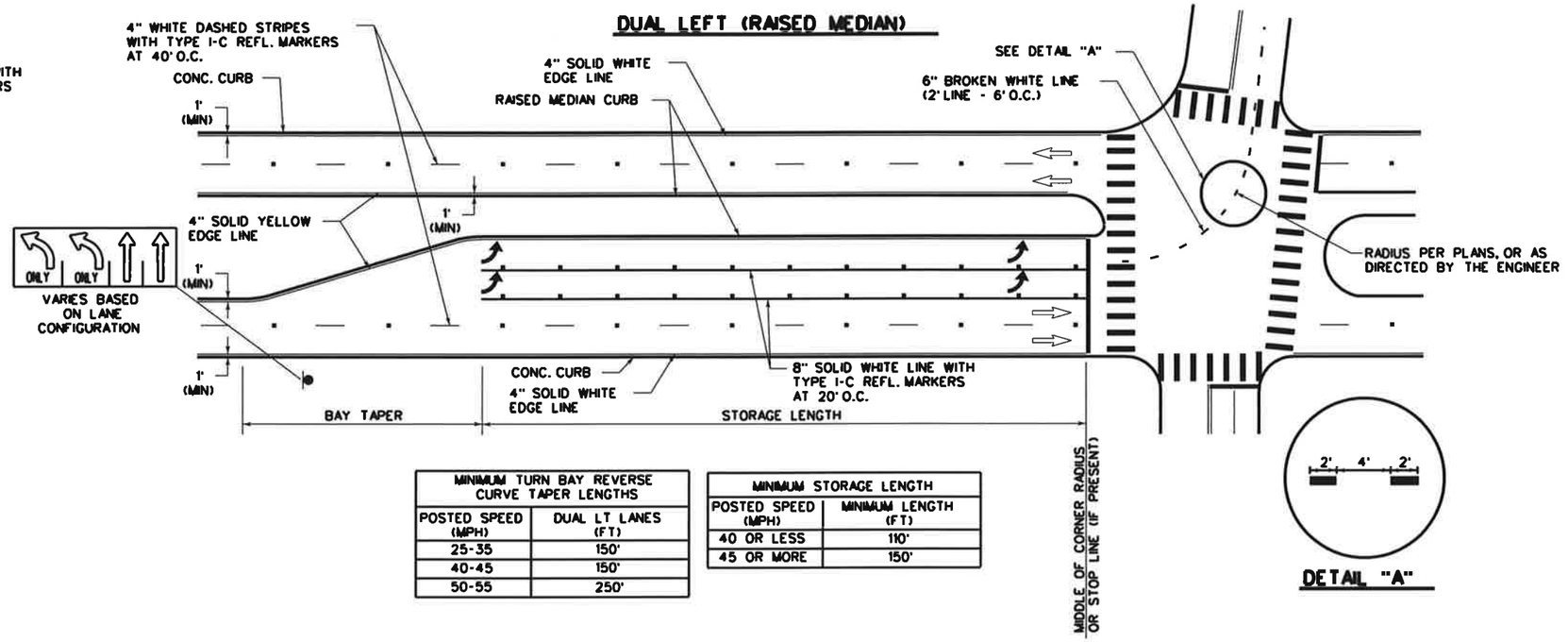
LEFT-TURN LANE



MINIMUM TURN BAY OPENINGS	
POSTED SPEED (MPH)	MINIMUM OPENING (FT)
25-35	60'
≥ 40	100'

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM OPENING (FT)
40 OR LESS	110'
45 OR MORE	150'

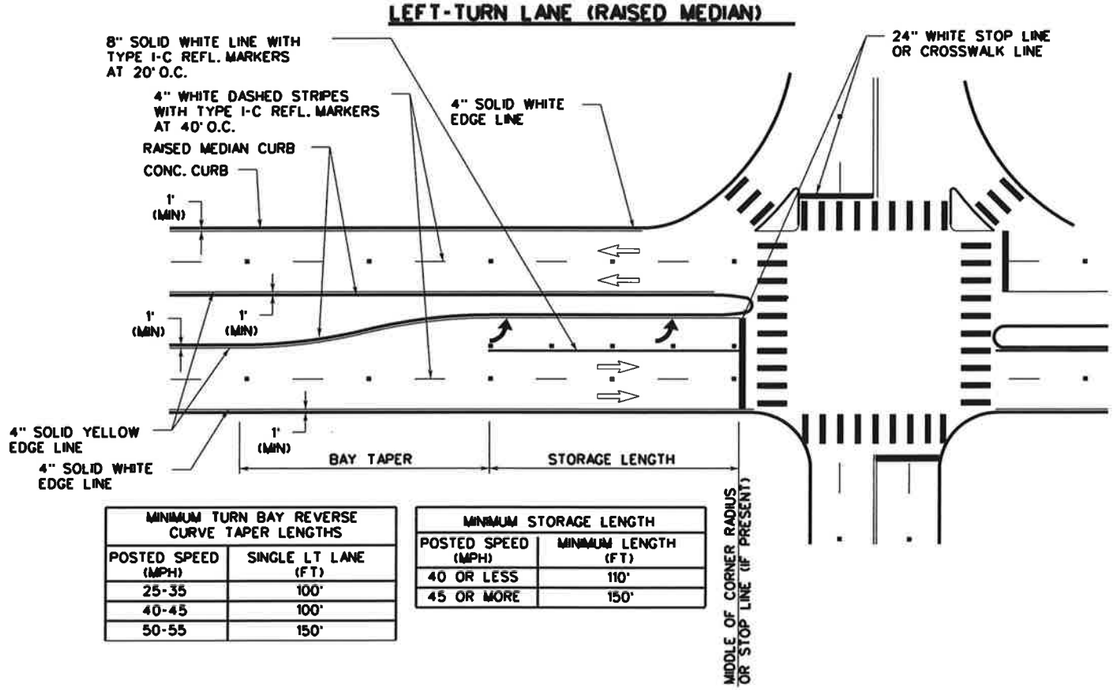
DUAL LEFT (RAISED MEDIAN)



MINIMUM TURN BAY REVERSE CURVE TAPER LENGTHS	
POSTED SPEED (MPH)	DUAL LT LANES (FT)
25-35	150'
40-45	150'
50-55	250'

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

LEFT-TURN LANE (RAISED MEDIAN)



MINIMUM TURN BAY REVERSE CURVE TAPER LENGTHS	
POSTED SPEED (MPH)	SINGLE LT LANE (FT)
25-35	100'
40-45	100'
50-55	150'

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

NOTES:

1. THE POSTED SPEED LIMIT IS TYPICALLY EQUAL TO THE DESIGN SPEED MINUS 5 MPH.
2. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) IN THE MINIMUM LENGTH TABLES ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
3. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
4. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
5. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
6. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.
7. 4" SOLID WHITE AND YELLOW EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

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CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

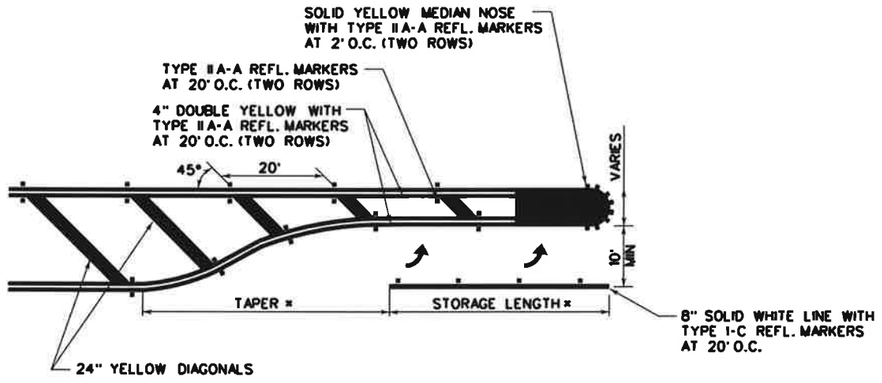
LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 1

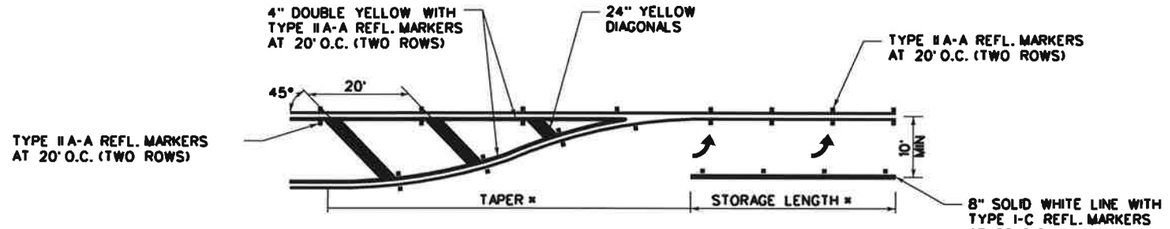
SHEET 10 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

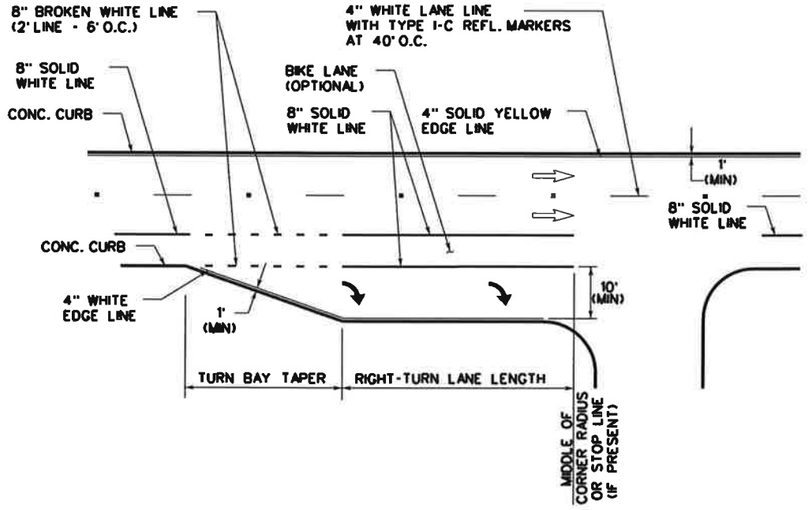
PAINTED MEDIAN LEFT TURN BAY DETAILS

* - USE MINIMUM TURN BAY REVERSE CURVE TAPER LENGTH AND MINIMUM STORAGE LENGTH TABLES FOR "LEFT-TURN LANE (RAISED MEDIAN)" ON SHEET 10 OF 16.





UNSIGNALIZED RIGHT-TURN LANE



MINIMUM TURN BAY TAPER LENGTH	
POSTED SPEED (MPH)	LENGTH (FT)
30 OR LESS	90'
35 OR MORE	120'

MINIMUM RIGHT-TURN LANE LENGTH	
POSTED SPEED (MPH)	LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

NOTES:

1. THE POSTED SPEED LIMIT IS TYPICALLY EQUAL TO THE DESIGN SPEED MINUS 5 MPH.
2. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) IN THE MINIMUM LENGTH TABLES ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
3. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
4. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
5. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
6. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.
7. 4" SOLID WHITE AND YELLOW EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

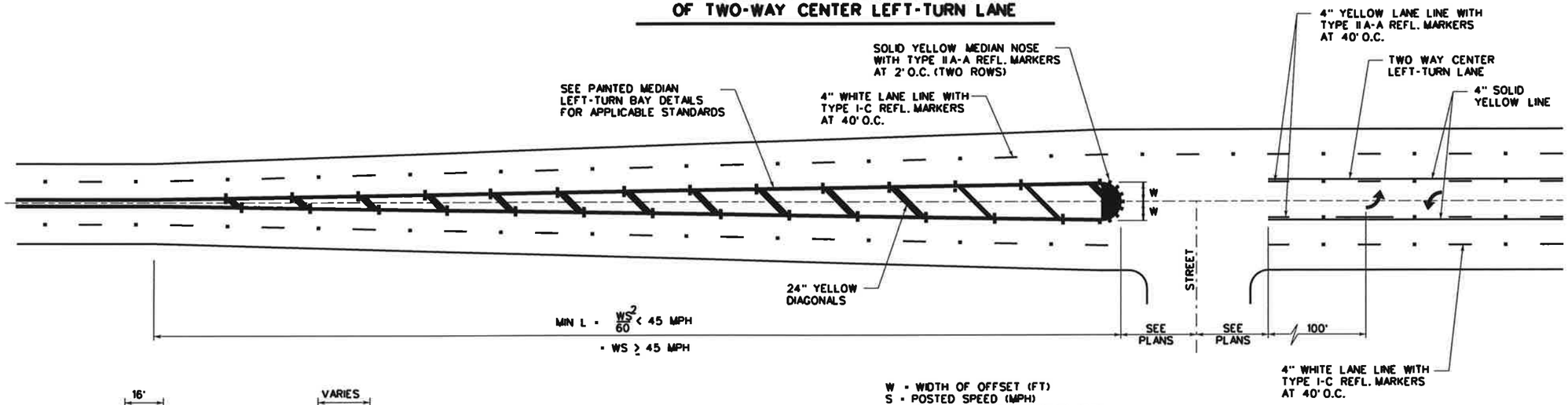
TRAFFIC ENGINEERING STANDARDS

LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 2

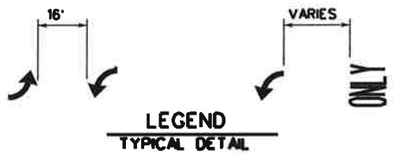
SHEET 11 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

TYPICAL TRANSITION AT BEGINNING AND END OF TWO-WAY CENTER LEFT-TURN LANE



W = WIDTH OF OFFSET (FT)
S = POSTED SPEED (MPH)
L = LENGTH OF CROSSHATCHING (FT)



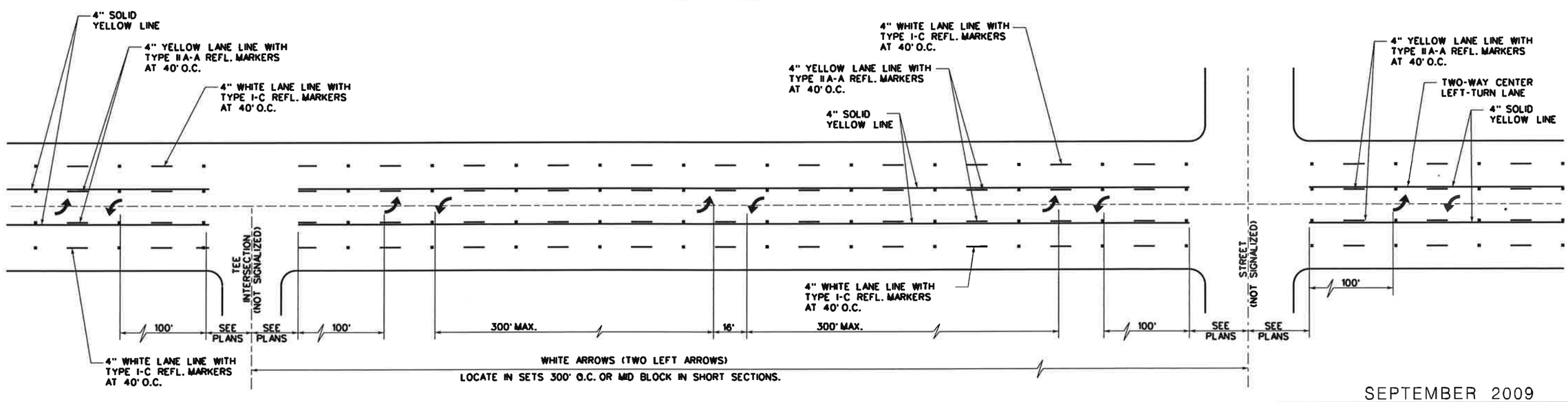
LEGEND
TYPICAL DETAIL

(PLACE LEGENDS IN ACCORDANCE TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET)

NOTE:

1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

TWO-WAY LEFT-TURN LANE DETAILS NON-SIGNALIZED INTERSECTIONS



SEPTEMBER 2009

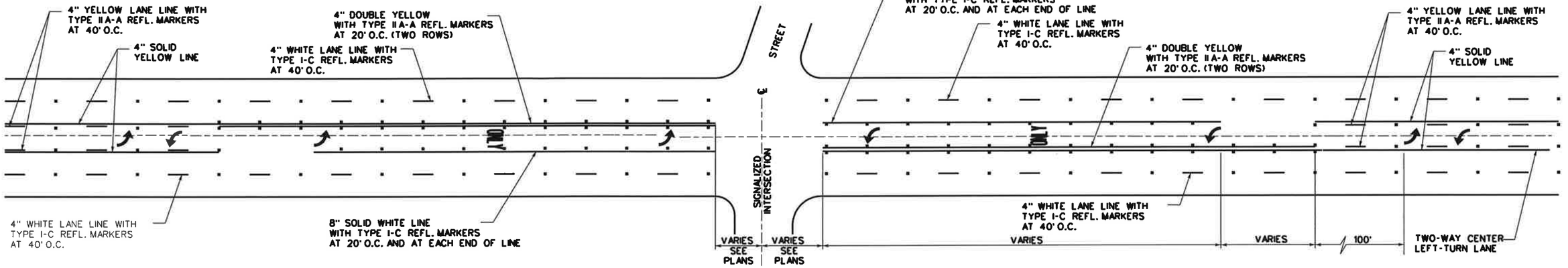
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
TWO-WAY LEFT-TURN LANE DETAILS 1
SHEET 12 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

TYPICAL TWO-WAY LEFT-TURN LANE DETAILS

SIGNALIZED INTERSECTION



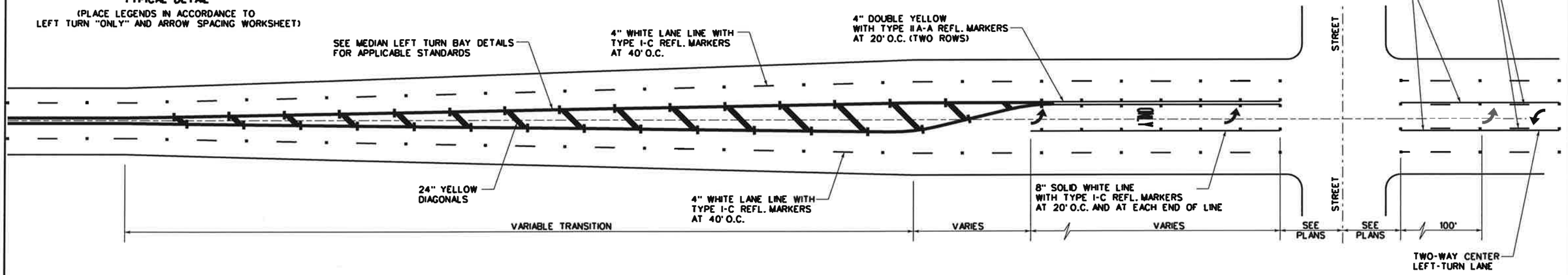
LEGEND

TYPICAL DETAIL

(PLACE LEGENDS IN ACCORDANCE TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET)

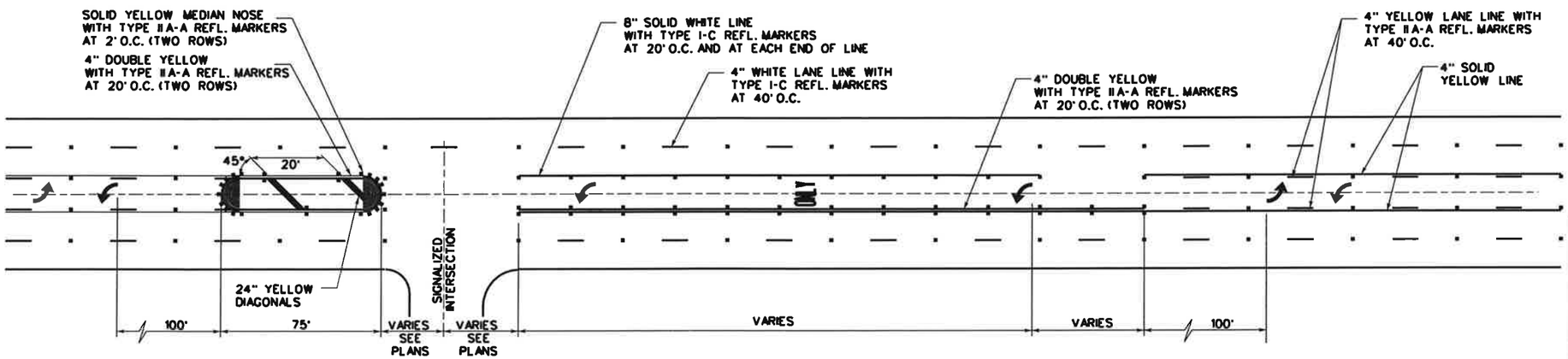
TYPICAL MEDIAN LEFT TURN BAY

SIGNALIZED AND NON-SIGNALIZED CROSS STREETS AT BEGINNING AND END OF TWO-WAY CENTER LEFT-TURN LANE



TYPICAL TWO-WAY LEFT-TURN LANE DETAILS

SIGNALIZED TEE INTERSECTION



NOTE:

1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

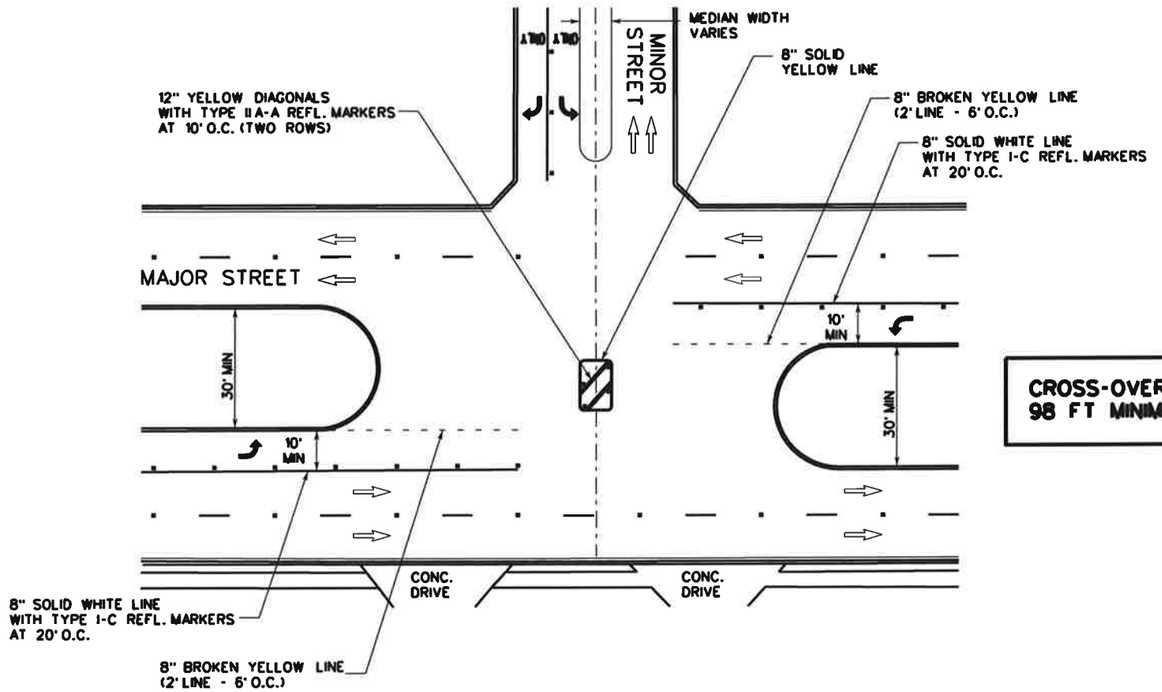
TRAFFIC ENGINEERING STANDARDS

TWO-WAY LEFT-TURN LANE DETAILS 2

SHEET 13 OF 16

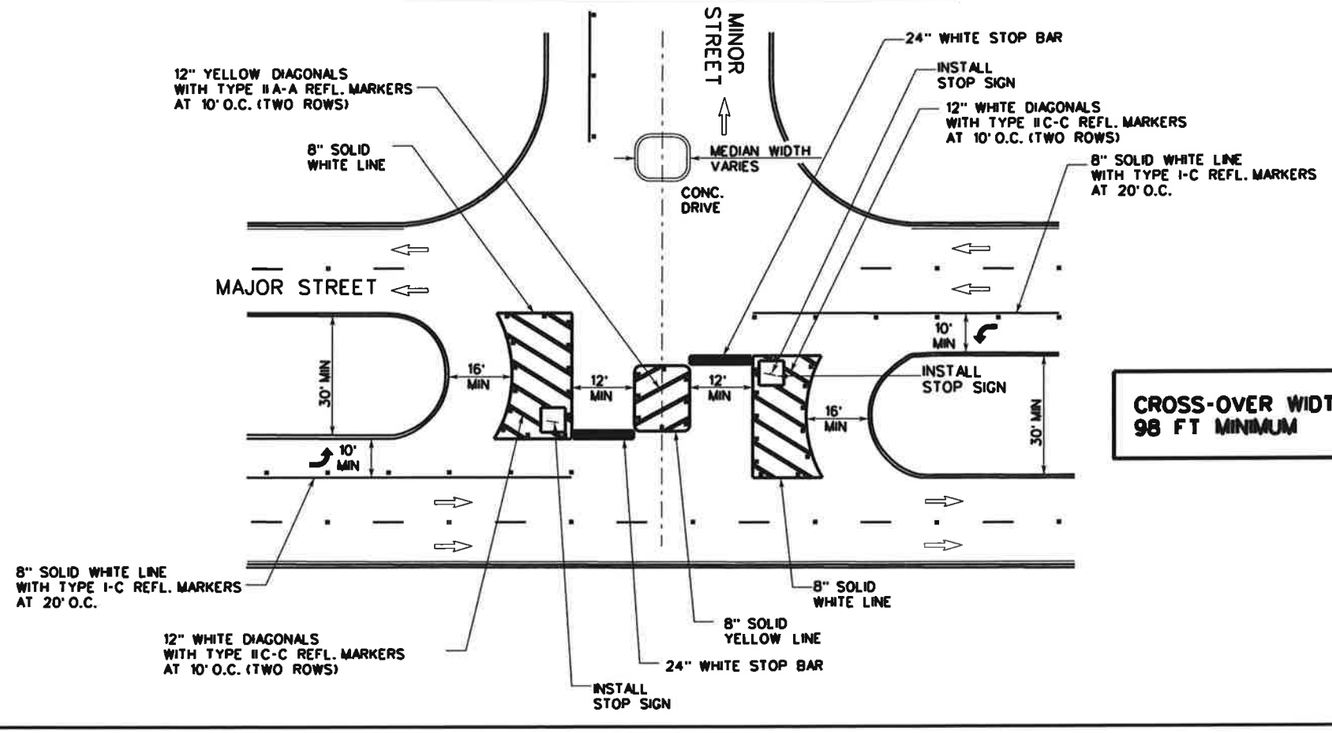
% SUBMITTAL	PROJECT NO.	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

CROSS-OVER MEDIAN OPENING WITHOUT TURN AROUND STRIPING "TEE" INTERSECTION



CROSS-OVER WIDTH 98 FT MINIMUM

CROSS-OVER MEDIAN OPENING WITH TURN AROUND STRIPING "TEE" INTERSECTION



CROSS-OVER WIDTH 98 FT MINIMUM

NOTE:

1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING. STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

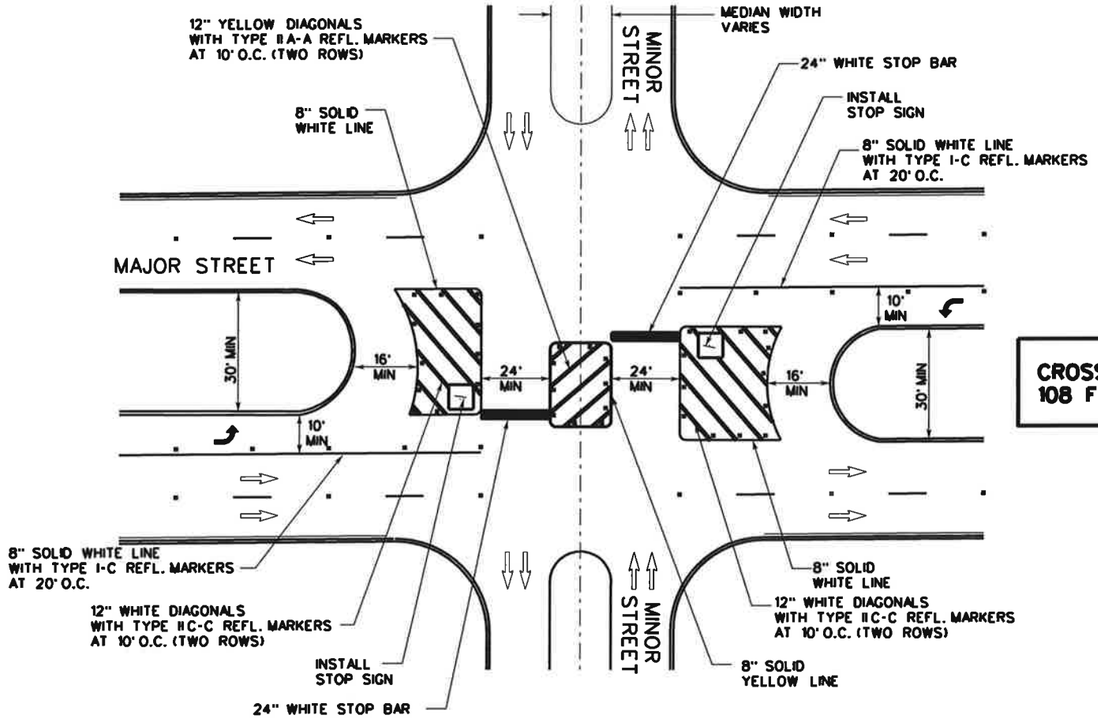
TRAFFIC ENGINEERING STANDARDS

STANDARD CROSS-OVER MEDIAN OPENING 1

SHEET 14 OF 16

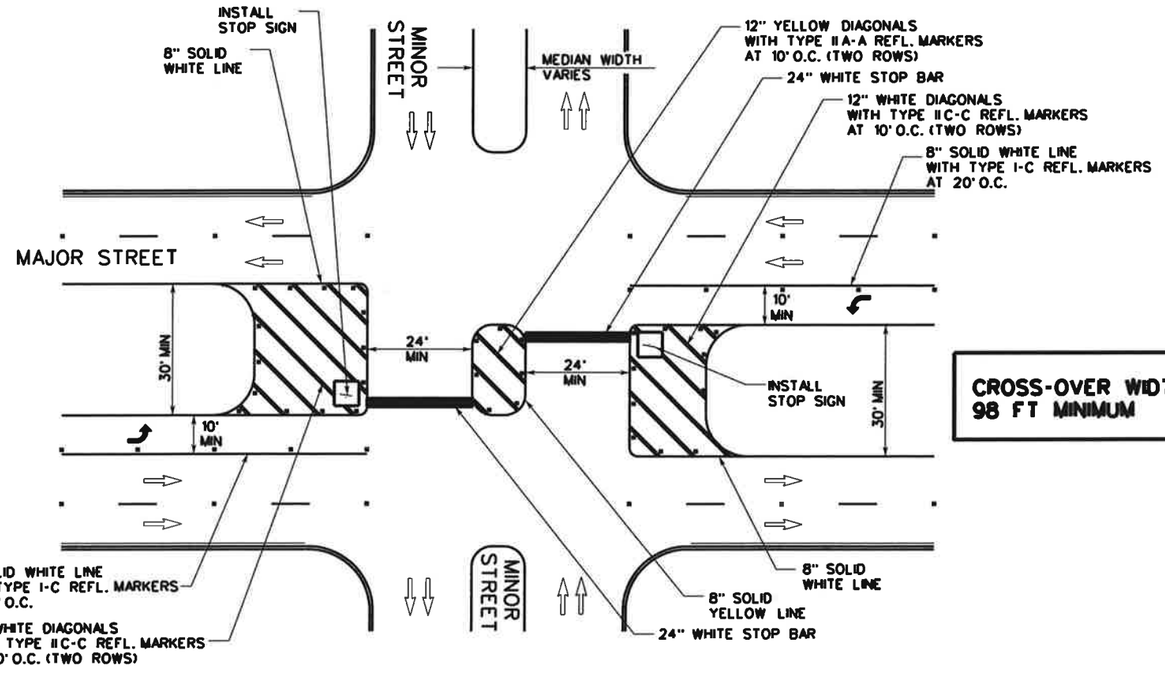
% SUBMITTAL	PROJECT NO.		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY M.E.	SHEET NO.: OF:

CROSS-OVER MEDIAN OPENING WITH TURN AROUND STRIPING FOUR-WAY INTERSECTION



CROSS-OVER WIDTH 108 FT MINIMUM

CROSS-OVER MEDIAN OPENING WITHOUT TURN AROUND STRIPING FOUR-WAY INTERSECTION



CROSS-OVER WIDTH 98 FT MINIMUM

NOTE:

1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING. STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

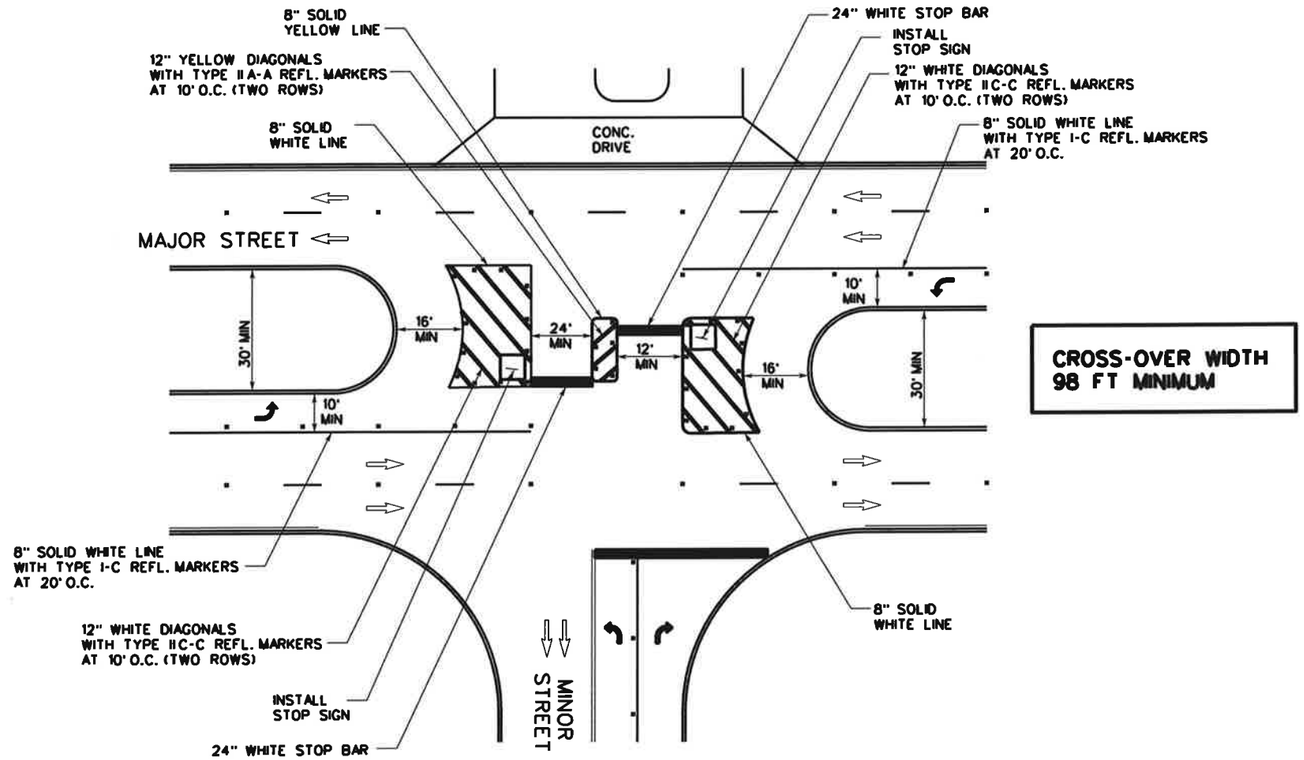
SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
STANDARD CROSS-OVER MEDIAN OPENING 2
SHEET 15 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: OF

CROSS-OVER MEDIAN OPENING WITH TURN AROUND STRIPING "TEE" INTERSECTION



CROSS-OVER WIDTH 98 FT MINIMUM

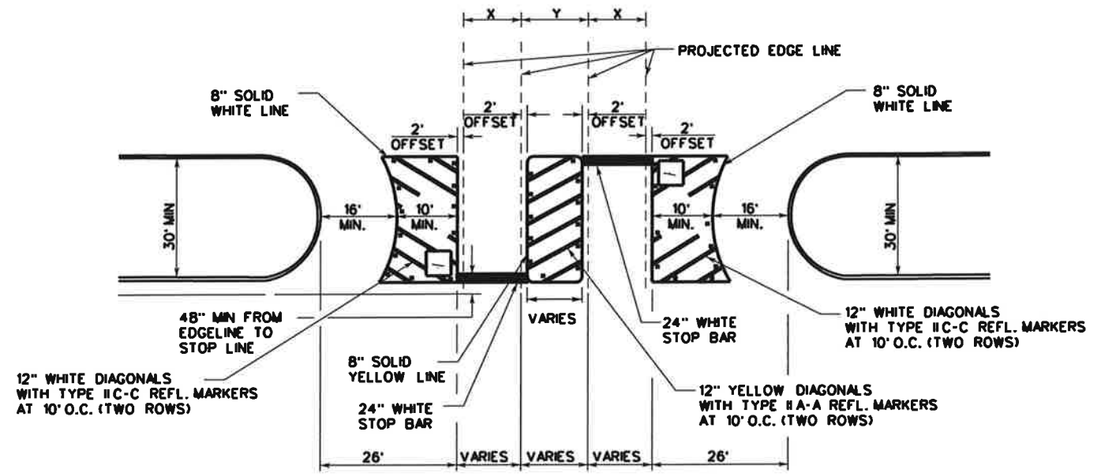
NOTE:

1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING. STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

MISCELLANEOUS CROSS-OVER DETAIL WITH TURN AROUND STRIPING

NOTE:

1. X - ROADWAY WIDTH AND NUMBER OF LANES VARIES
2. Y - MEDIAN WIDTH VARIES



SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

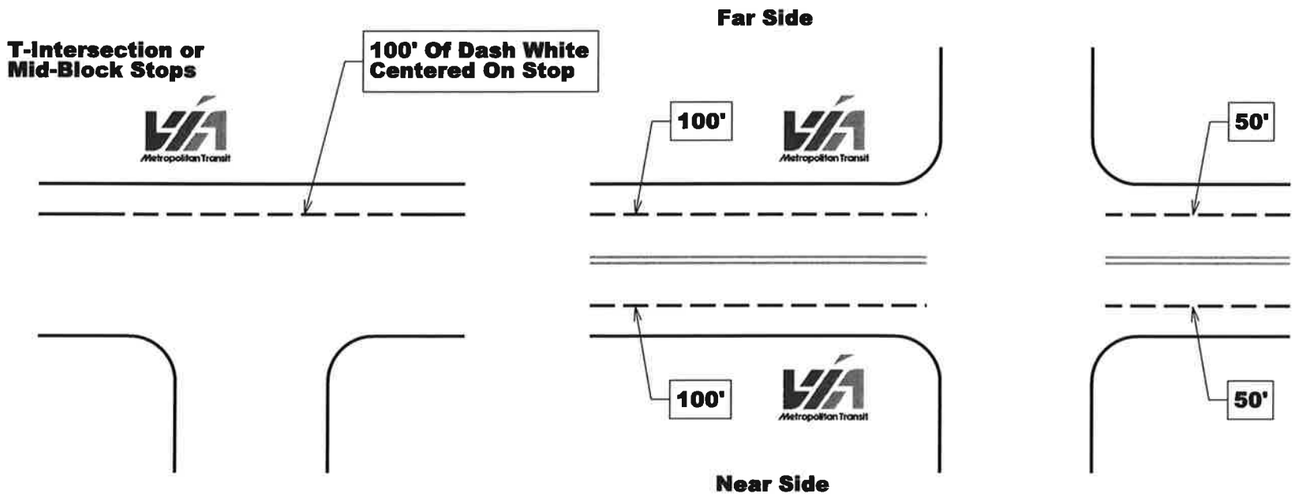
TRAFFIC ENGINEERING STANDARDS

STANDARD CROSS-OVER MEDIAN OPENING 3

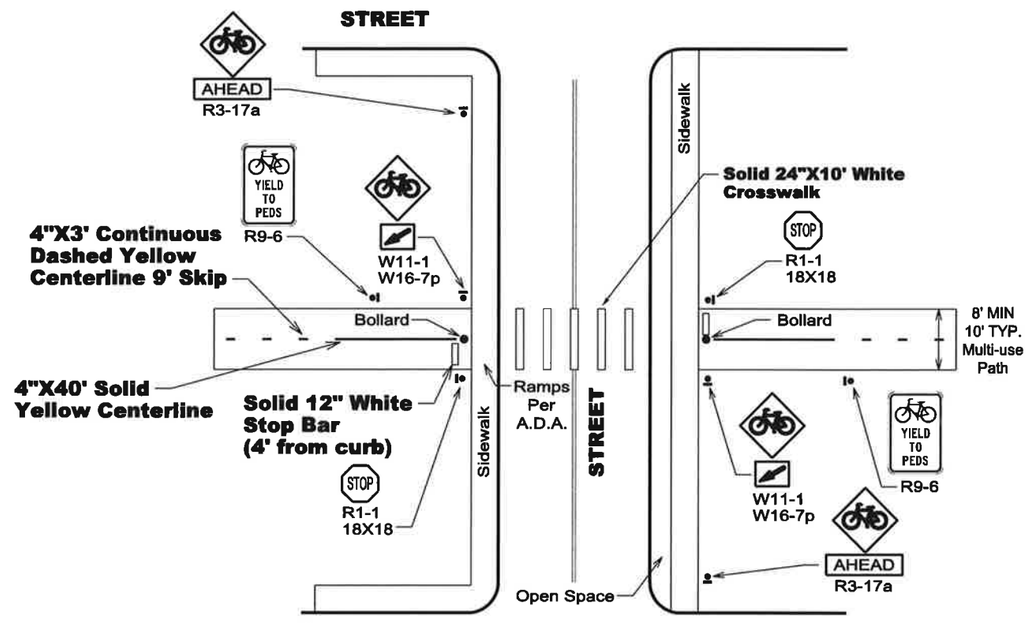
SHEET 16 OF 16

% SUBMITTAL	PROJECT NO.		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: OF

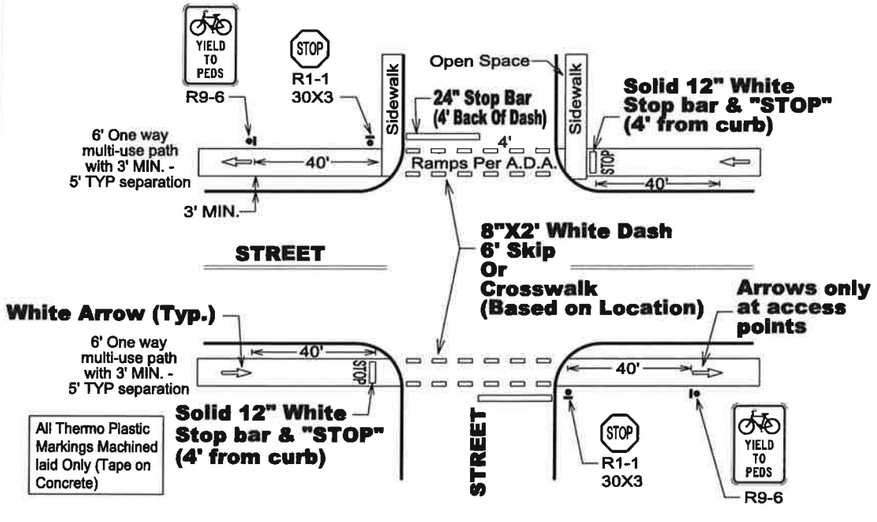
Intersection Approach Standards With/Without VIA



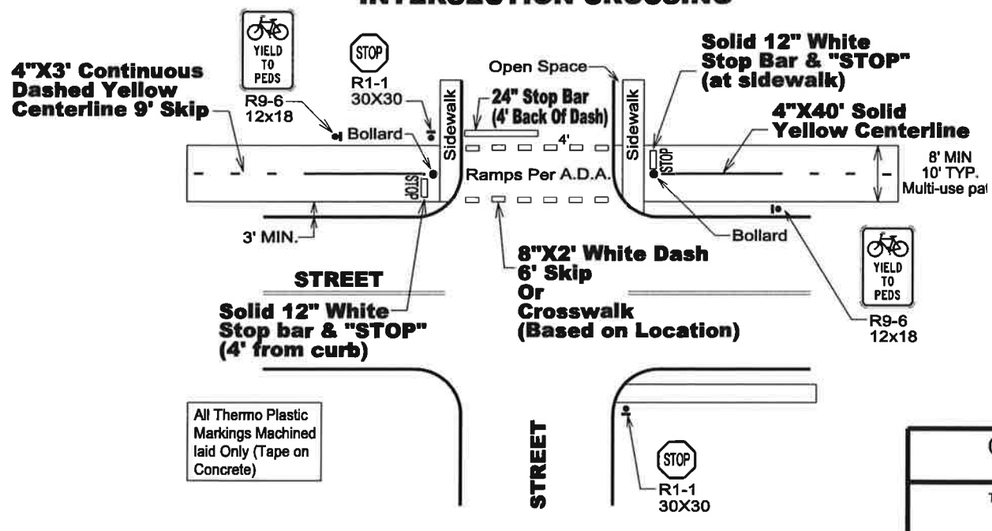
TWO-WAY MULTI-USE PATH
MID BLOCK CROSSING



ONE-WAY MULTI-USE PATH
AT
INTERSECTION CROSSING



TWO-WAY MULTI-USE PATH
AT
INTERSECTION CROSSING



FEBRUARY 2012

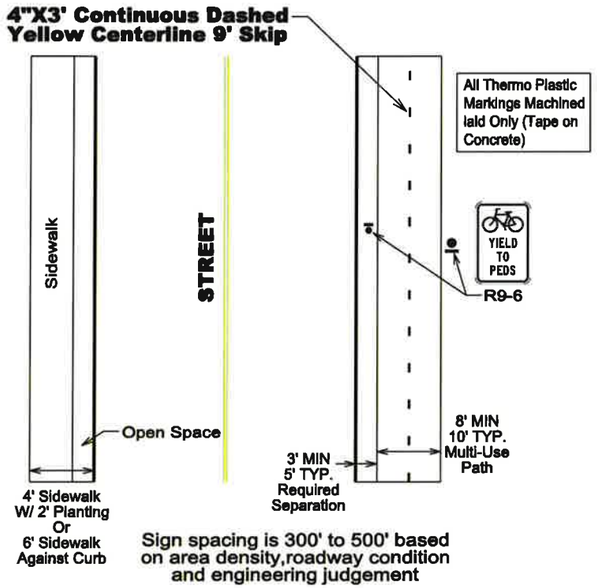
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING BICYCLE STANDARDS

PAVEMENT MARKING PLACEMENT STANDARDS

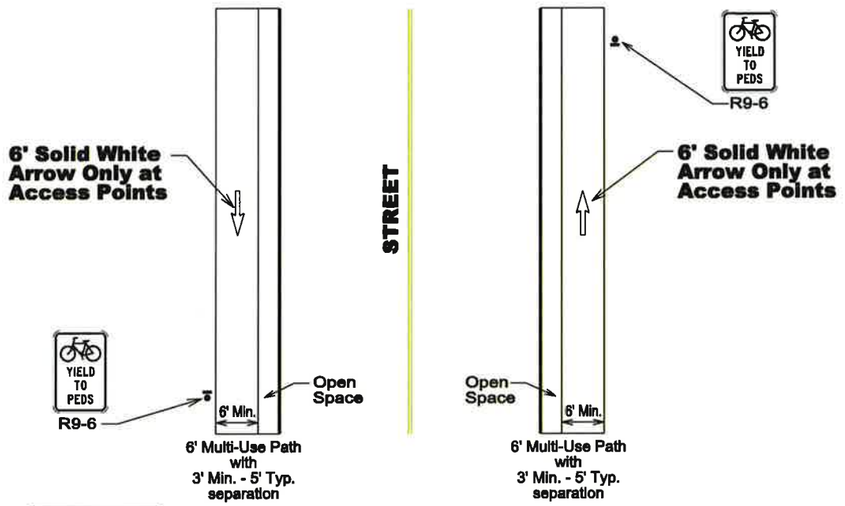
% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: B.C.	DSGN. BY: W.T.	CHKD. BY: J.S.W.T.	SHEET NO.: OF

TWO-WAY MULTI-USE PATH ON A COLLECTOR OR ARTERIAL



Sign spacing is 300' to 500' based on area density,roadway condition and engineering judgement

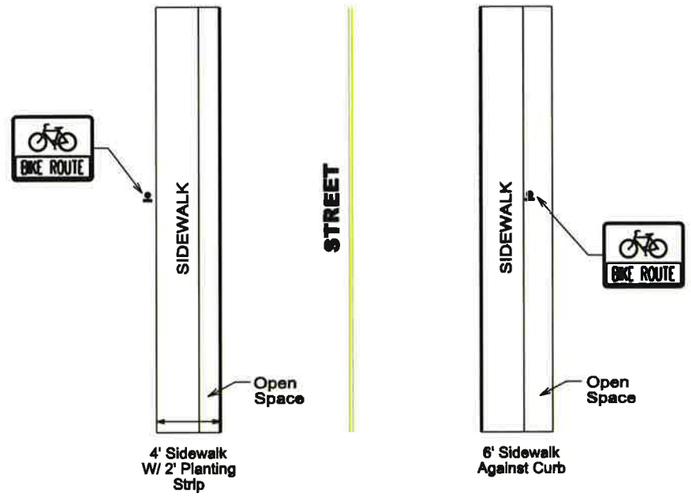
ONE-WAY MULTI-USE PATH



All Thermo Plastic Markings Machined laid Only (Tape on Concrete)

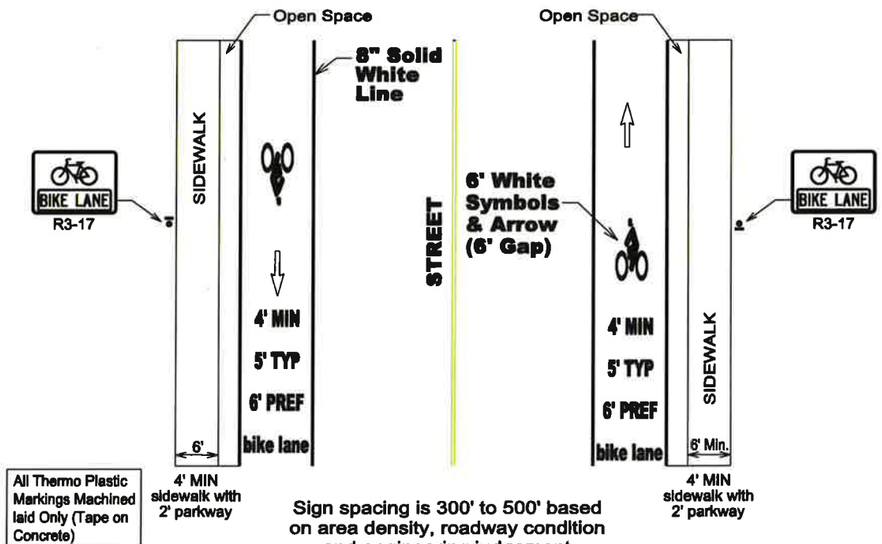
Sign spacing is 300' to 500' based on area density,roadway condition and engineering judgement

BICYCLE ROUTE ON A COLLECTOR OR ARTERIAL



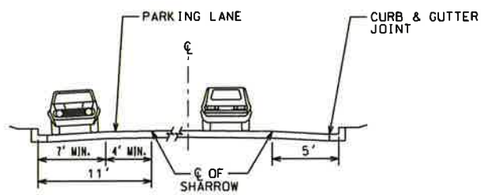
Sign spacing is 300' to 500' based on area density,roadway condition and engineering judgement

ONE-WAY BICYCLE LANE



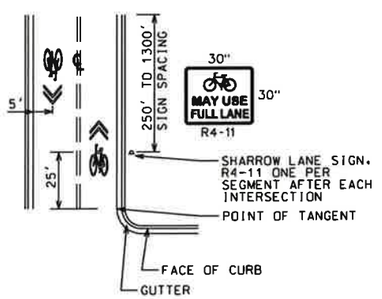
Sign spacing is 300' to 500' based on area density, roadway condition and engineering judgement

TYPICAL SHARROW LAYOUT



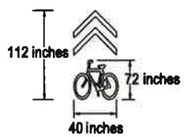
SHARROW LANE WITH PARKING
NTS

SHARROW LANE WITHOUT PARKING
NTS



SHARROW DETAIL

Figure 9C-9. Shared Lane Marking



FEBRUARY 2012

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING BICYCLE STANDARDS

PAVEMENT MARKING PLACEMENT STANDARDS

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: B.C.	DSGN. BY: W.T.	CHKD. BY: J.S. W.T.	SHEET NO.: OF

TRAFFIC NOTES

TRENCHING / EXCAVATING

The following notes shall apply to excavations of trenches or pits that are located in the pavement or are within six (6) feet of the edge of roadway:

1.) Trench walls shall not be closer than three (3) feet from the edge of the traveled way at any stage of construction.

2.) Traffic control devices shall be in place before starting any excavation.

3.) Trenches or pits will not be permitted to be bridged by steel plates and open to traffic unless they are temporarily backfilled to finished street grade.

4.) For pits or trenches along or in a roadway that are going to be left open over night that are zero to fifty (0 – 50) feet in length, the following applies. GUARD RAIL OR CONCRETE BARRIER SHALL BE USED.

5.) For pits or trenches along or in roadway that are going to be left open over night and are longer than 50 feet in length, CONCRETE BARRIERS MUST BE USED.

6.) Plastic construction fencing shall be required for any trench or pit left open over night.

7.) When using any guardrail or concrete barrier, protected end must be used as per the TEXAS–M.U.T.C.D.

8.) For vertical drop–offs greater than two (2) feet along roadway, low profile concrete with appropriate end protection must be installed.

9.) All concrete barriers placed on City R.O.W shall be low profile. No high profile barriers will be allowed.

REFLECTIVE SHEETING

The reflectorized white and reflectorized orange stripes for channelizing devices such as barricade drums and vertical panels shall be constructed of reflective sheeting meeting the color and retro–reflectivity requirements of high intensity, unless otherwise specified in the plans.

MAINTENANCE

1.) All traffic signs shall be kept in proper position, clean and legible at all times. Damaged barricades, signs, and other traffic control devices shall be replaced without undue delay.

2.) To ensure adequate maintenance, a suitable schedule for inspection, cleaning, and replacement of barricades, lights, and signs shall be established.

3.) Special attention and necessary action shall be taken to see that weeds, trees, shrubbery and construction materials do not obscure the face of any sign or barricades.

TRAINING

Each person whose actions affect maintenance and construction zone safety, from the upper–level management personnel through construction and maintenance field personnel, should receive training appropriate to the job decision each individual is required to make. Only those individuals who are qualified by means of adequate training in safe traffic control practices and have a basic understanding of the principles established by applicable standards and regulations, including those of the TEXAS M.U.T.C.D. should supervise the selection, placement, and maintenance of traffic control devices in maintenance and construction areas.

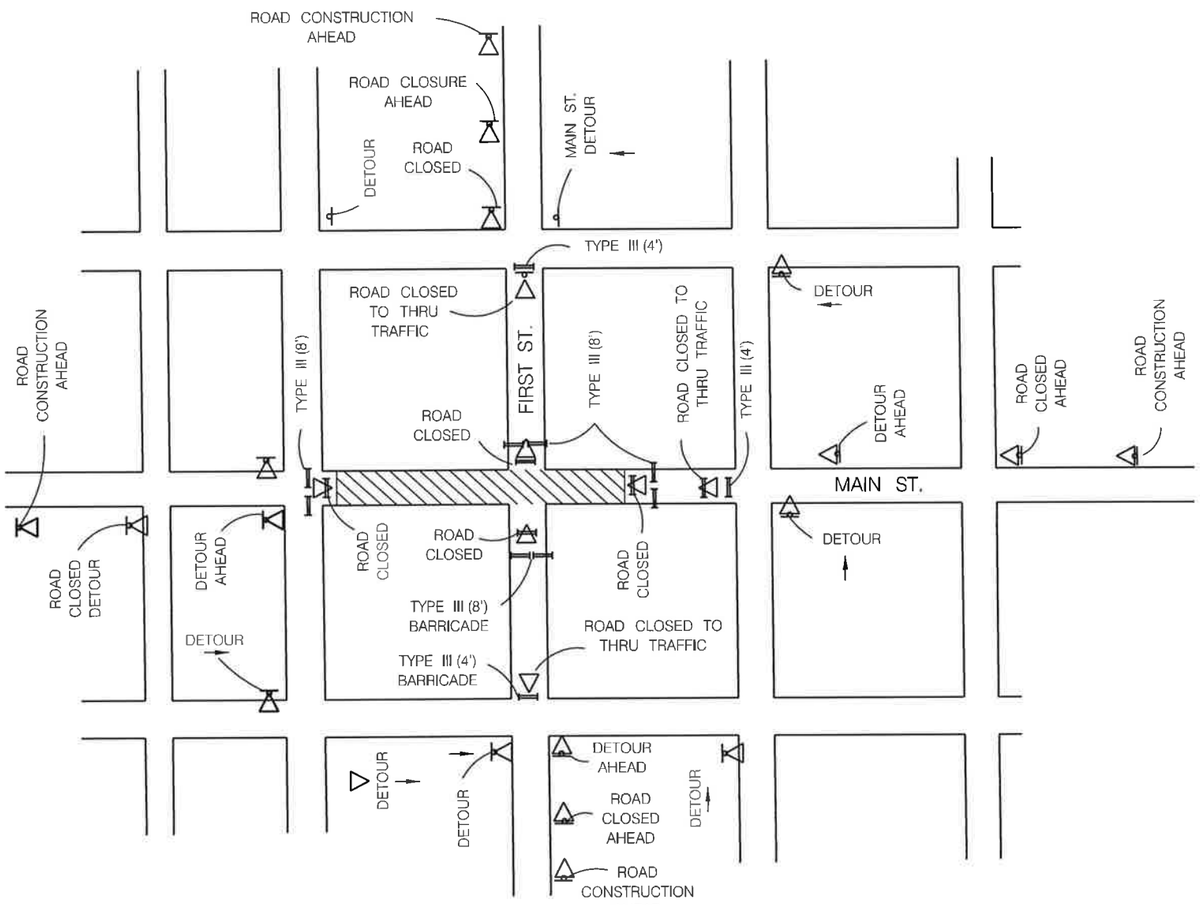
SPECIAL EVENTS BARRICADING

All Type I, (8') barricades used for special events (Dome, Runs, Walks, Parades etc.) shall be a minimum of 42" high and 96" wide. Any necessary signs will require proper sign stands.

USE OF CITY R.O.W.

The City of San Antonio reserves the right to allow contracting and barricading sub–contractors to use the City's R.O.W. The City also reserves the right to advise contractors and barricading sub–contractors to remove stored or unused traffic control devices from the City of San Antonio R.O.W. It is the barricading sub–contractor's responsibility to remove any traffic control device from City's R.O.W. when instructed to do so by a City representative.

CLOSURE DIAGRAMS



TYPICAL INTERSECTING STREET CLOSURE FOR TWO LANE STREETS

NOTE:
ALL SIGNS WILL BE MOUNTED ON SIGN SUPPORTS ONLY

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JUNE 2005

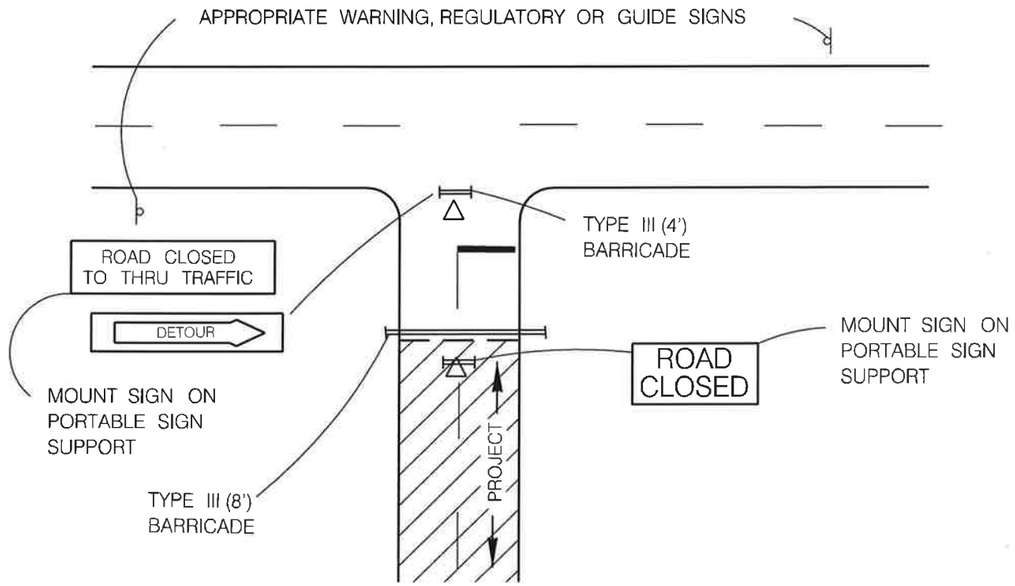
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS

BARRICADE AND CONSTRUCTION STANDARDS

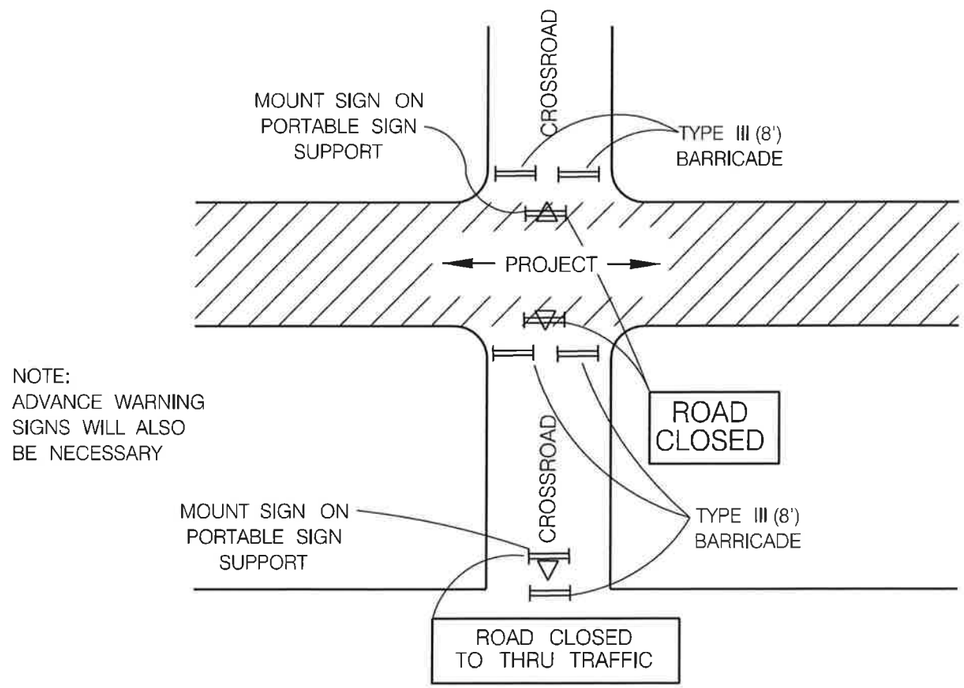
SHEET 1 OF 4

	PROJECT NO.: FY 2015 TCI ASPHALT TOC - PKG 1	DATE: AUGUST 2014
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F. / E.N.M.	SHEET NO.:



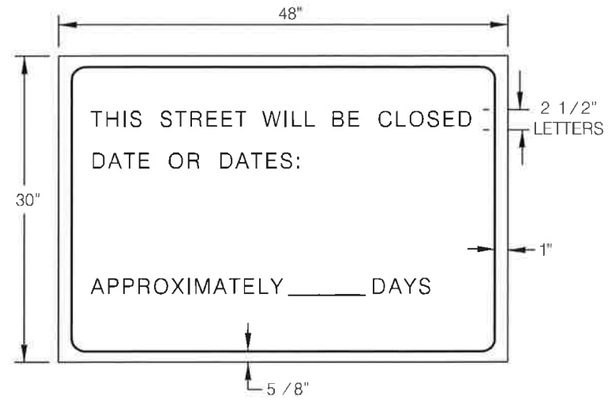
PROJECT LIMITS FOR CLOSED ROADWAY

BARRICADES SHALL BE ERECTED COMPLETELY ACROSS ROADWAY. CHANNELIZING DEVICES MAY BE DRUMS, VERTICAL PANELS OR CONES AS SPECIFIED IN THE PLANS

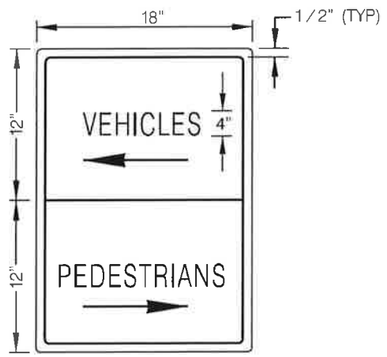


NOTE:
ADVANCE WARNING SIGNS WILL ALSO BE NECESSARY

CROSS STREET SIGNING AND BARRICADING TOTALLY CLOSED

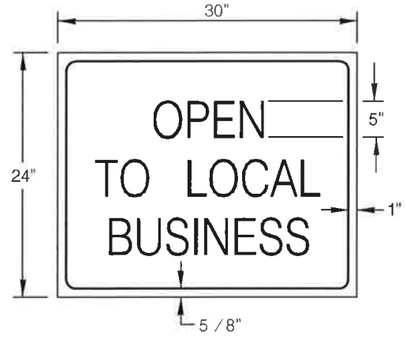


LETTERS– BLACK
BORDER– BLACK
BACKGROUND– ORANGE



LETTERS– BLACK
BORDER– BLACK
BACKGROUND– ORANGE
SPACING–3 SIGNS PER BLOCK

DIRECTION OF ARROWS ARE REVERSIBLE



LETTERS– WHITE
BORDER– WHITE
BACKGROUND– BLUE REFLECTIVE

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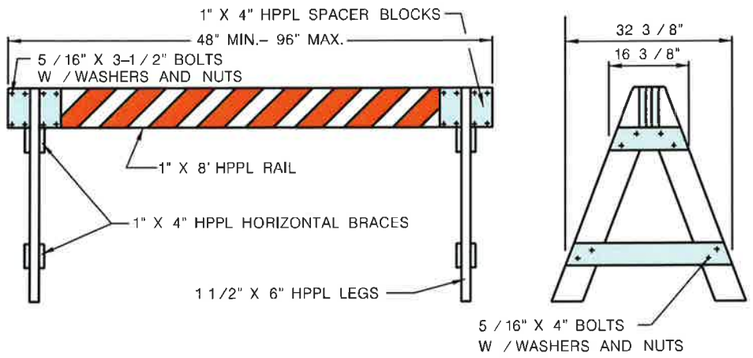
JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 2 OF 4

	PROJECT NO.: FY 2015 TCI ASPHALT TOC - PKG 1		DATE: AUGUST 2014
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F./E.N.M.	SHEET NO.:

TYPE I BARRICADE



1.) Only the following Type I barricade shall be used in the City of San Antonio Right–Of–Way:

A. 1" x 8" plastic rail with 2" x 6" wooden legs.

B. 1" x 8" wooden rail with plastic legs.

C. 1" x 8" wooden rail with 2" x 6" wood legs.

D. No screws allowed for assembly of A–legs or rail.

E. Warning lights will be used as directed by the Traffic Engineer.

F. All Type I (4') barricades will be a minimum of 36" high and 60" wide. (For Construction Use Only)

G. All Type I (8') barricades with wooden legs shall be 2" X 6" wood only.

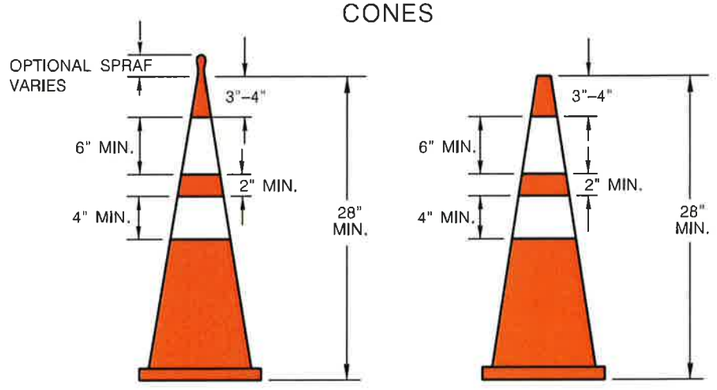
H. All Type I (4') barricades with wooden legs shall be 1" X 8" wood only.

2.) Type I Barricades shall not be used for partial and total street closures in construction work zones. Only Type III barricades shall be used for this purpose.

3.) Warning lights shall not be mounted on Type I barricades.

(See TxDOT BC–03 Sheets for specific construction information)

CONES

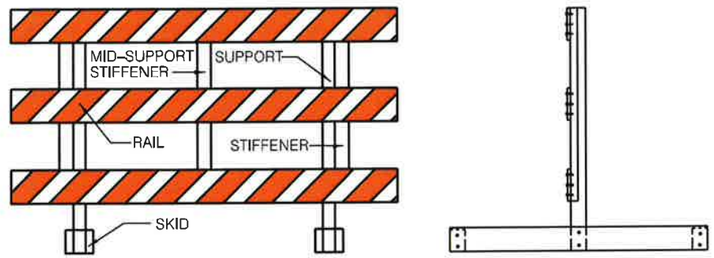


1.) Base for 28" high cones must weigh at least 9.5 lbs.

2.) Night time cones must have reflective collars.

(See TxDOT BC–03 Sheets for specific construction information)

Type III BARRICADE



1.) Only the following Type III barricade shall be used in the City of San Antonio Right–Of–Way.

A. Hollow polyvinyl or fiberglass tubing post with 1" X 8" wooden rails.

B. Hollow polyvinyl or fiberglass tubing post with plastic rails.

C. Skids must be wood or solid plastic only.

D. Warning lights shall not be mounted on Type III barricades.

(See TxDOT BC–03 Sheets for specific construction information)

TEMPORARY MARKINGS

1.) Solid double yellow painted lines shall be installed for temporary division of traffic or construction duration longer than five (5) days, with repainting to occur once monthly or at the discretion of the Traffic Engineer. (All cost of upkeep will be at the contractor's expense.)

2.) Solid double yellow tabs, or V/P panels shall be installed for temporary division of traffic for construction duration less than five (5) days, with re–tabbing to occur at the discretion of the Traffic Engineer.
NAILS SHALL NOT BE USED TO FIX TABS TO CEMENT OR BASE
(All cost of upkeep will be at the contractor's expense.)

(See TxDOT BC–03 Sheets for specific construction information.)

TEMPORARY CONCRETE BARRIER

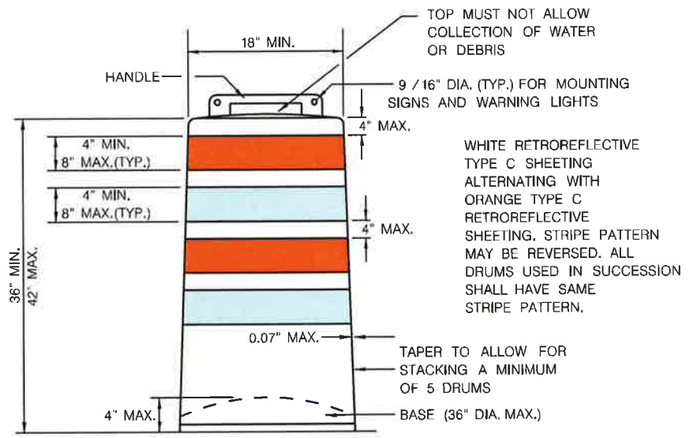
1.) All concrete barriers placed on City R.O.W. shall be low profile.

2.) No high profile barriers will be allowed.

3.) Reflectors will be required on each concrete barrier.

(See TxDOT BC–03 Sheets for specific construction information)

PLASTIC DRUMS



1.) Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).

2.) Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.

3.) The Engineer/Inspector shall provide written notice to the Contractor regarding the replacement of drums or other traffic control devices. The Contractor shall have a maximum of 24 hours to replace any plastic drums or other traffic control devices identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

4.) Each drum must have a 40 lb. rubber or plastic snap on.

5.) No signs larger than 18" X 24" will be allowed to be mounted on plastic drums.

6.) No warning lights will be allowed to be mounted on plastic barrels.

7.) In lieu of a warning light, a yellow reflector will be acceptable.

(See TxDOT BC–03 Sheets for specific construction information)

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 3 OF 4

	PROJECT NO.: FY 2015 TCI ASPHALT TOC - PKG 1	DATE: AUGUST 2014
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F./E.N.M.	SHEET NO.:

THE ORIGINAL OF THIS DRAWING WAS SIGNED AND SEALED BY JOHN D. FRISBELE, #46394 ON 06-20-05 AND IS ON FILE WITH THE TRAFFIC ENGINEERING DIVISION OF THE PUBLIC WORKS DEPARTMENT, CITY OF SAN ANTONIO.

SIGNS

1.) A maximum of two signs can be mounted on any one Long / Intermediate Term Stationary Portable Sign Support.

2.) 48" X 48" signs shall be mounted separately on the Long / Intermediate Term Stationary Portable Sign Support.

3.) For Short Term Stationary Portable Sign Support the distance from the bottom of the vinyl sign to the exiting ground must be one (1) foot.

4.) Long / Intermediate Term Stationary Portable Signs must be made of wood or plastic only.

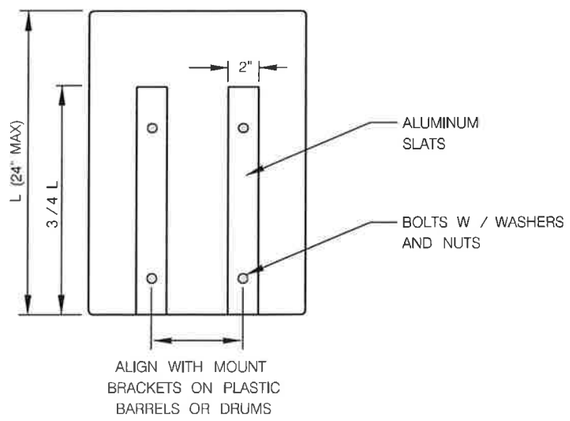
5.) No signs shall be mounted to any Type I, Type III, or folding barricades.

6.) Signs shall be mounted only on TxDOT approved sign supports.

7.) Detour signs will be mounted on single "D" legs w / 7' clearance from the bottom of the sign.

8.) WORK DURATION TERMINOLOGY
Long Term Stationary = occupies a location 3 or more days.
Intermediate-Term Stationary = occupies a location for overnight to 3 days.
Short Term Stationary = daylight work that occupies a location from 1 to 12 hours.
Short Duration = occupies a location up to 1 hour.

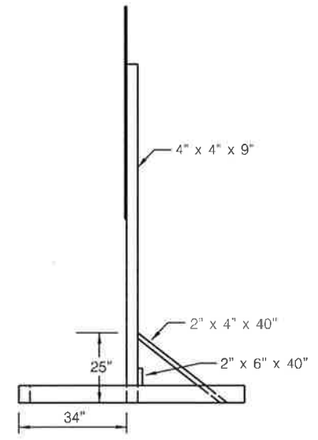
9.) Signs shall adhere to the following requirements:
- Signs placed on plastic barrels or drums shall be made of ABS plastic or plywood.
- Signs placed on skids shall be made of plywood or aluminum.
- Aluminum signs shall have a minimum thickness of 0.08".
- Plywood signs shall have a minimum thickness of 1 / 2".
- ABS Plastic signs shall have a minimum thickness of 0.13". Plastic signs cannot exceed 18" by 24" in size and shall be reinforced with 2" wide, 0.08" thick aluminum slats, as depicted below:



- No other material shall be accepted without the express written approval of the Traffic Engineer.

(See TxDOT BC-03 Sheets for specific construction information.)

LONG TERM / INTERMEDIATE TERM SIGN SUPPORT



1.) 48" X48" signs must be mounted independently.

2.) A maximum of two signs can be mounted on any one long term / intermediate sign support.

3.) Sand bag all sign supports.

4.) Distance from the bottom of the sign to the existing ground shall be 7'.

5.) Distance from the header barricade rail to the face of the sign panel shall be 2' min. and 10' max.

6.) Steel tripods shall not be allowed.

(See TxDOT BC-03 Sheets for specific construction information)

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 4 OF 4

	PROJECT NO.: FY 2015 TCI ASPHALT TOC - PKG 1		DATE: AUGUST 2014
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F. /E.N.M.	SHEET NO.:

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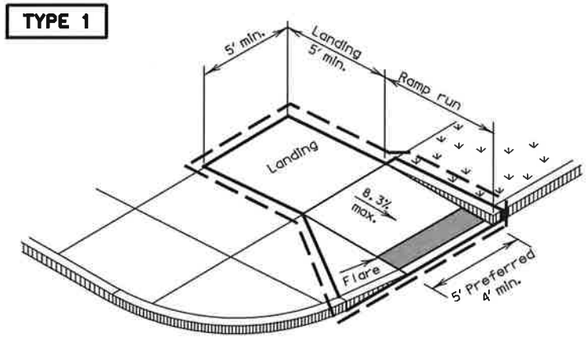
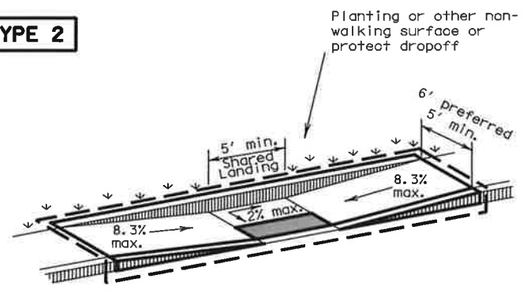
TYPE 1



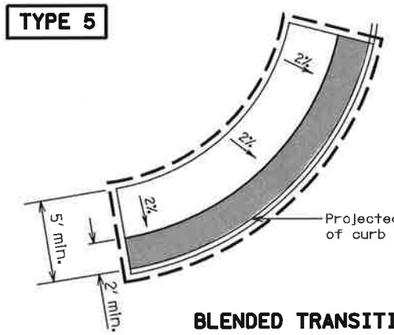
PERPENDICULAR CURB RAMP

TYPE 2



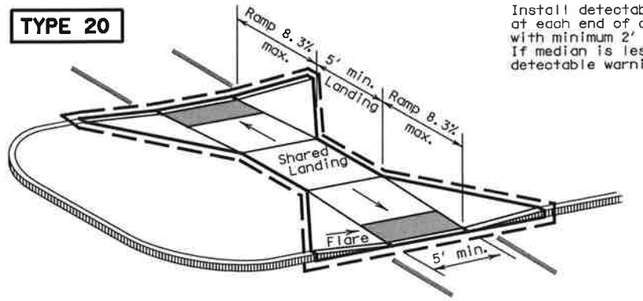
PARALLEL CURB RAMP
(Use only where water will not pond in the landing.)

TYPE 5



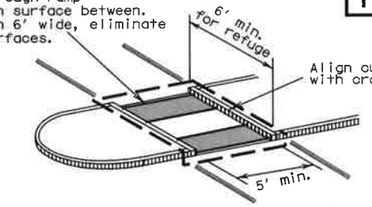
BLENDED TRANSITION

TYPE 20



Install detectable warning surface at each end of out-through ramp with minimum 2' smooth surface between. If median is less than 6' wide, eliminate detectable warning surfaces.

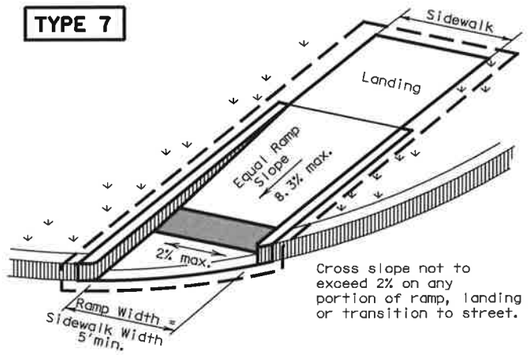
TYPE 21



Curb details are shown elsewhere in the plans.

CURB RAMPS AT MEDIAN ISLANDS

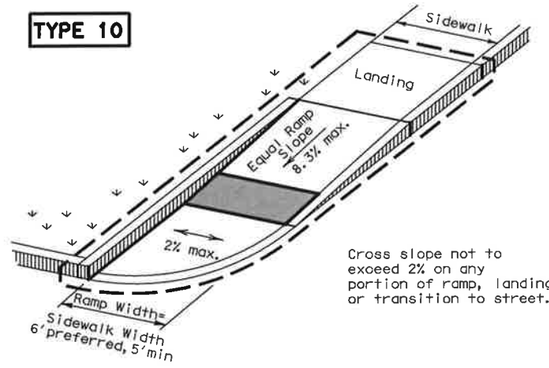
TYPE 7



Cross slope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk set back from curb)

TYPE 10

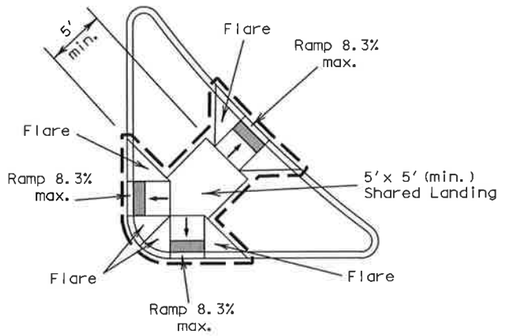


Cross slope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk adjacent to curb)

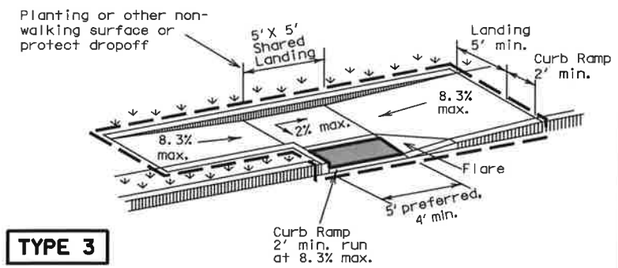
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 22

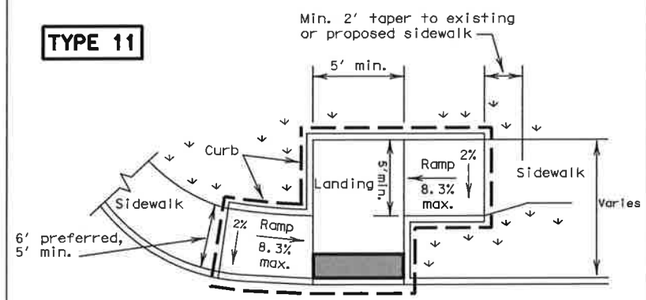


COMBINATION ISLAND RAMPS

TYPE 3

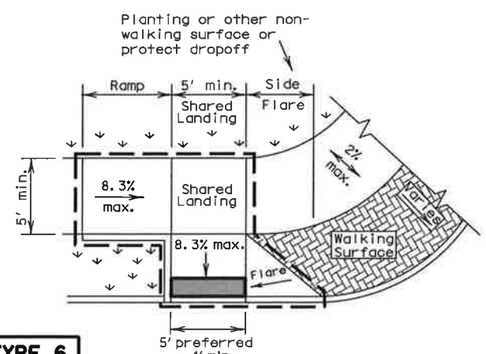


TYPE 11



OFFSET PARALLEL CURB RAMP

TYPE 6



COMBINATION CURB RAMPS

NOTES / LEGEND:

See General Notes on sheet 2 of 4 for more information.

Denotes planting or non-walking surface not part of pedestrian circulation path.

Ramp Limits of Payment

Detectable Warning Surface

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn		DN: TxDOT	CK: RM	DW: TxDOT	CK: VP		
©TxDOT March 2002		CONT	SECT	JOB		HIGHWAY	
REVISIONS							
VP June 13, 2012		DIST	COUNTY			SHEET NO.	

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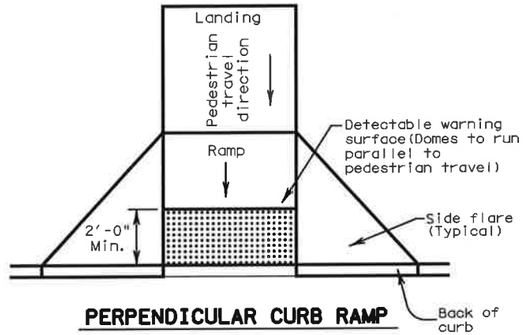
General Notes

Curb Ramps

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
4. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
5. Maneuvering space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
6. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Handrails are not required on curb ramps. Provide curb ramps wherever on accessible route crosses (penetrates) a curb.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Provide a smooth transition where the curb ramps connect to the street.
16. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
17. Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

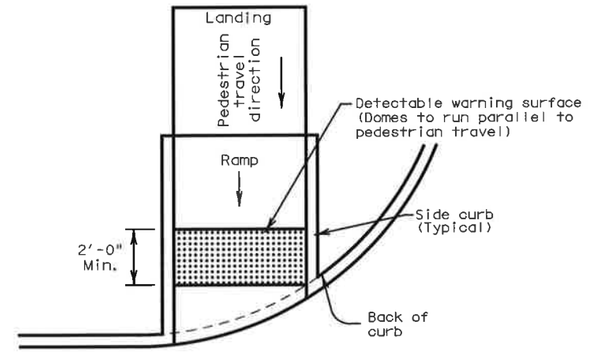
Detectable Warning Material

18. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
19. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
20. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
21. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
22. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. Align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Detectable warning surfaces may be curved along the corner radius.
23. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.



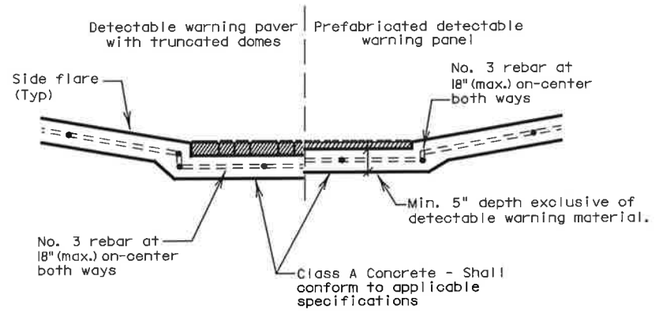
PERPENDICULAR CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.

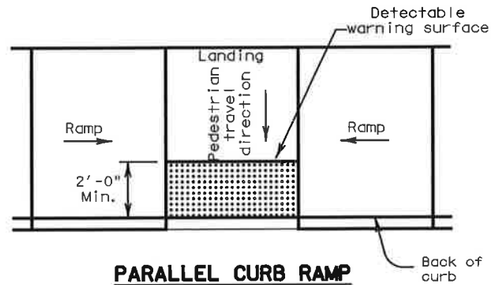


DIRECTIONAL CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.



SECTION: CURB RAMP AT DETECTABLE WARNING



PARALLEL CURB RAMP

Typical placement of detectable warning surface on landing at street edge.

DETECTABLE WARNINGS

Detectable Warning Pavers

24. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
25. Lay full-size units first followed by closure units consisting of at least 25 percent of a full unit. Cut detectable warning paver units using a power saw.

Sidewalks

26. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
27. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
28. Street grades and cross slopes shall be as shown elsewhere in the plans.
29. Changes in level greater than 1/4 inch are not permitted.
30. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
31. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
32. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
33. Sidewalk details are shown elsewhere in the plans.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: RM	DW: TxDOT	CK: VP
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REVISIONS VP June 13, 2012				
	DIST	COUNTY		SHEET NO.

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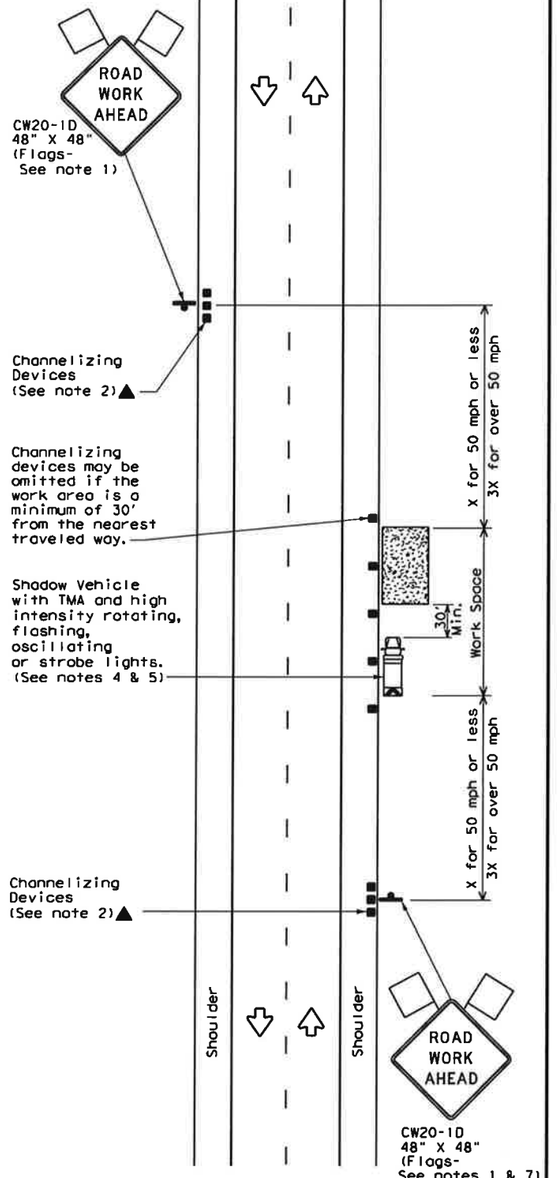
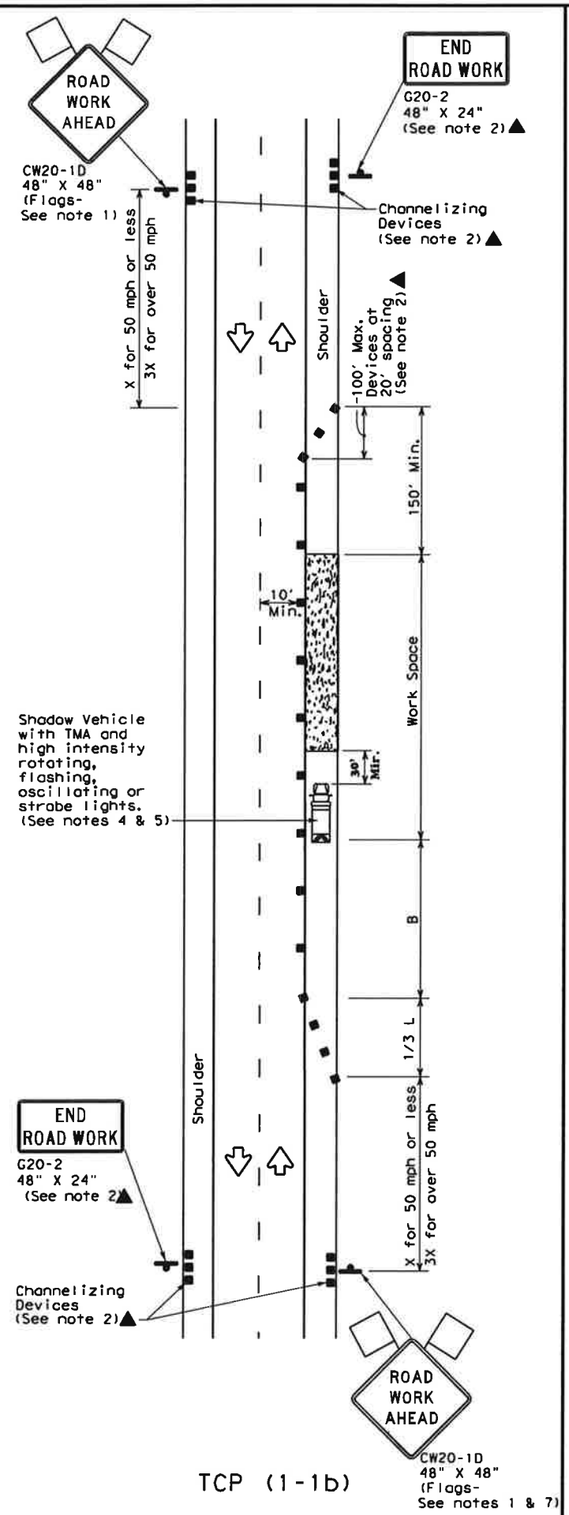


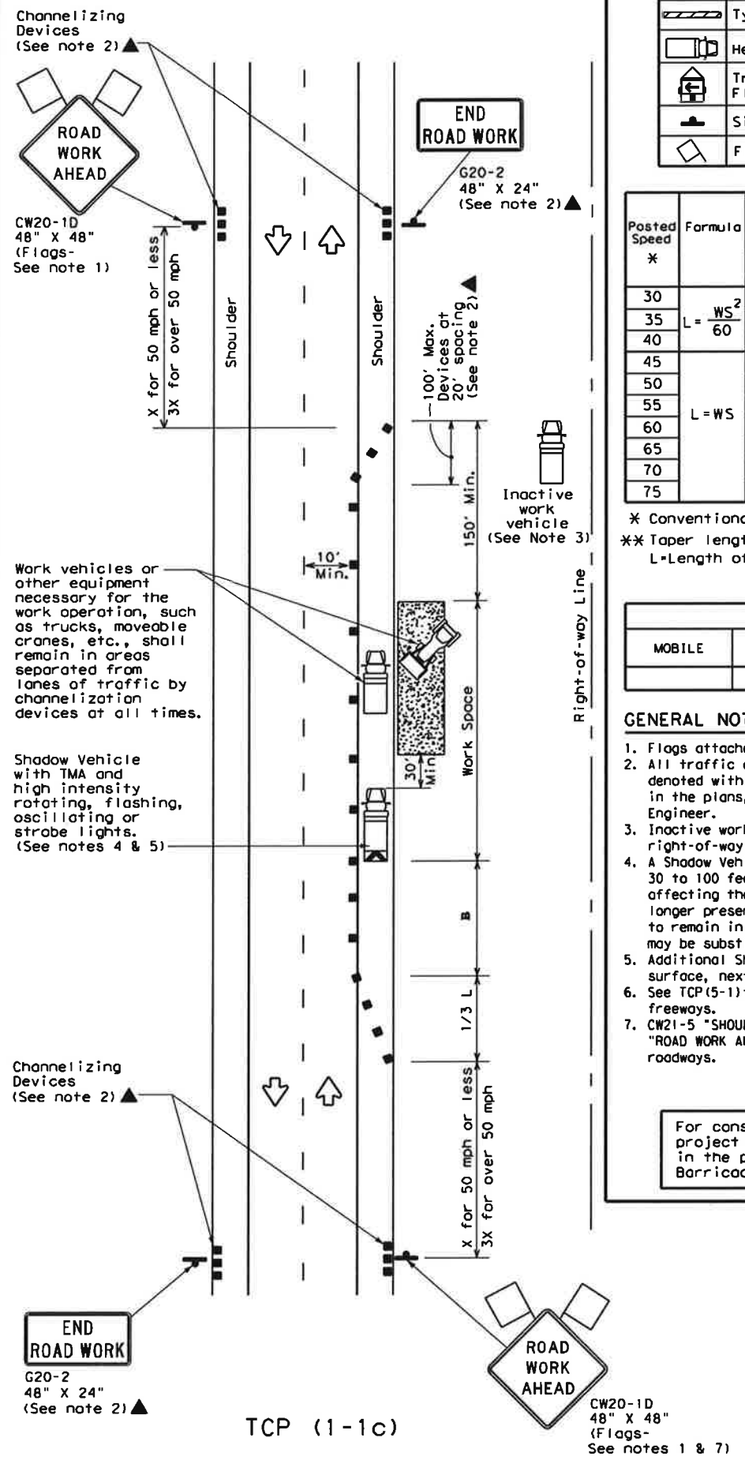
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-12

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REVISIONS	CONT	SECT	JOB	HIGHWAY
2-94 2-12				
8-95				
1-97	DIST	COUNTY		SHEET NO.
4-98				

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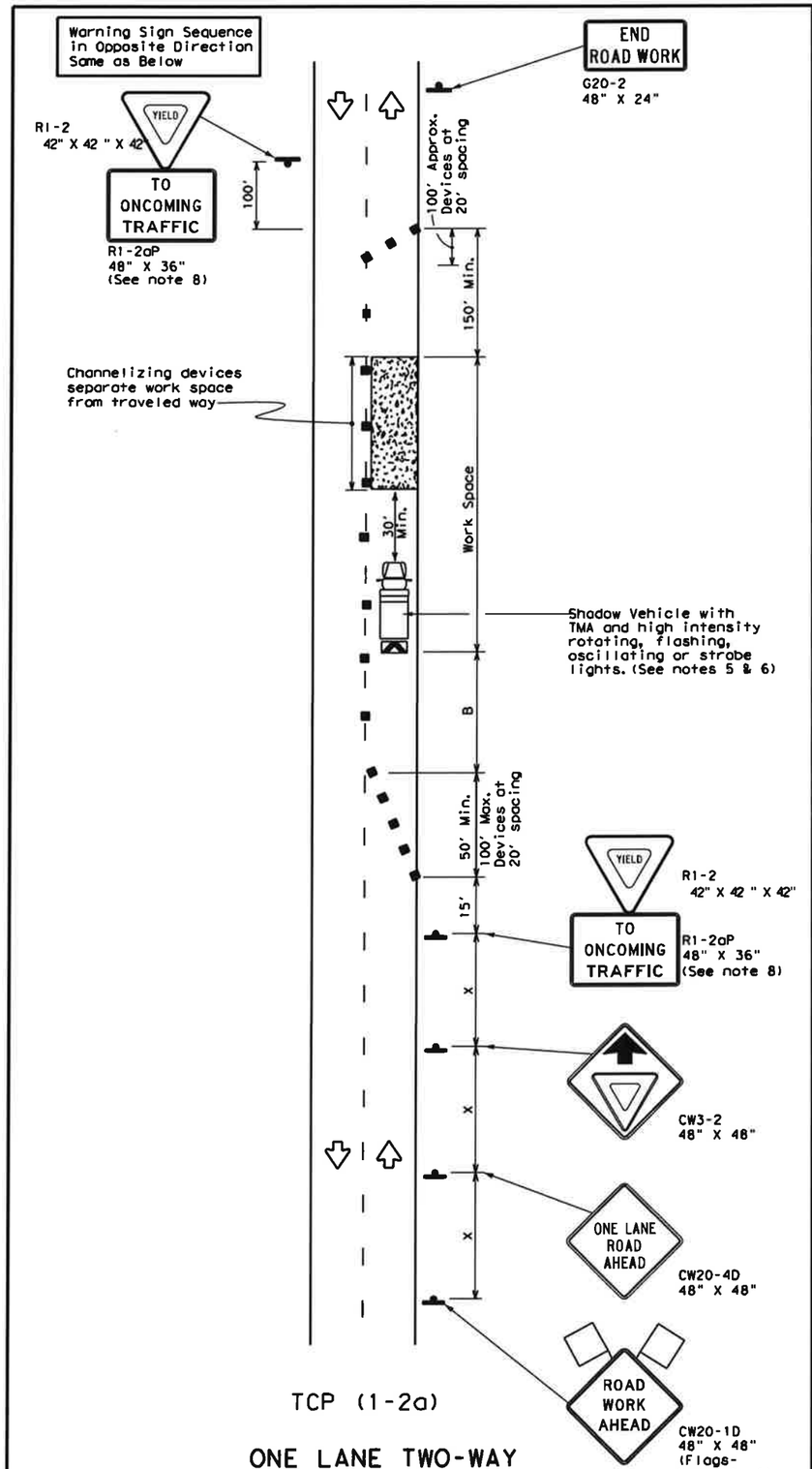
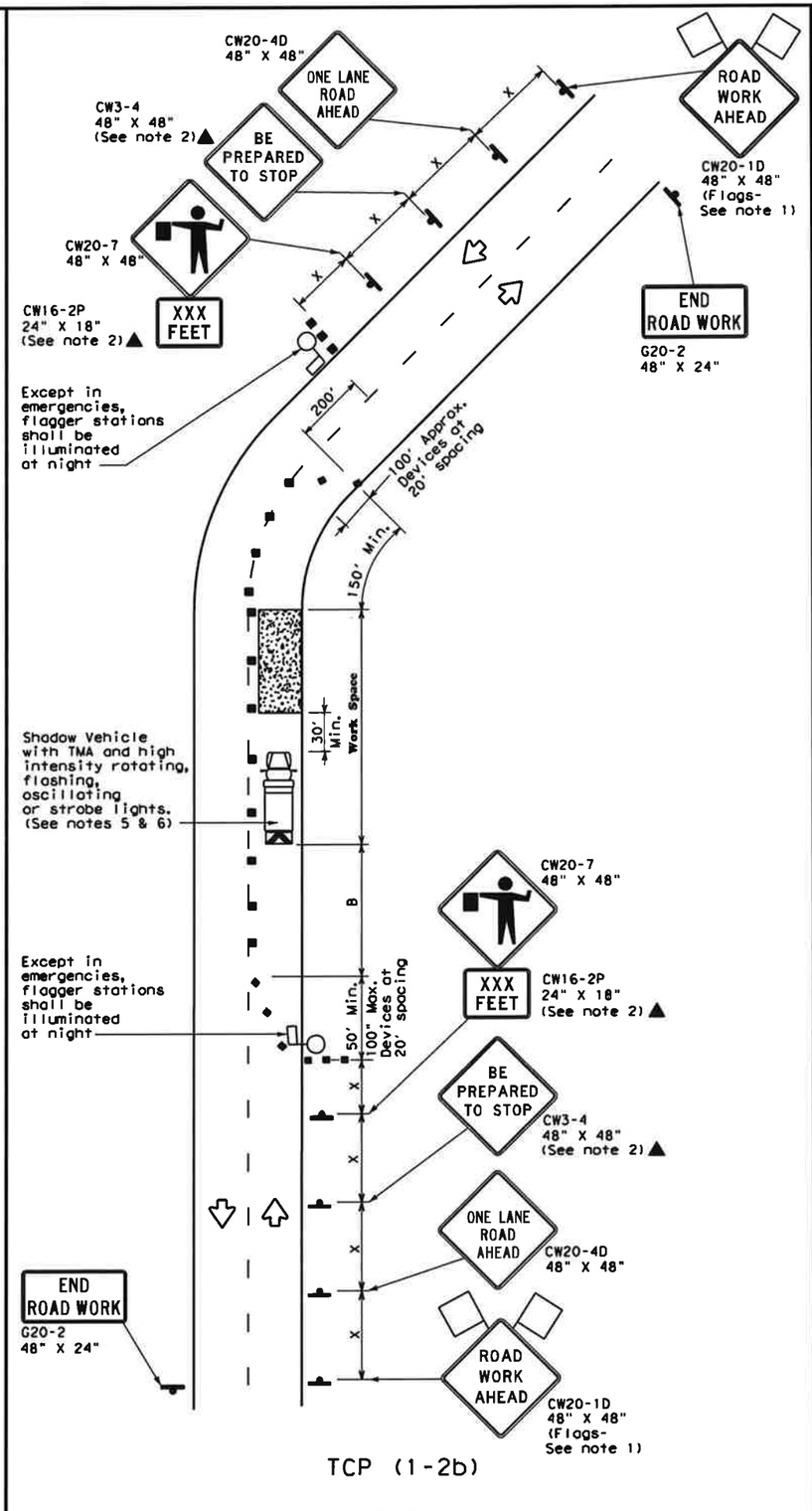


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-12

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
4-90 2-12				
2-94	DIST	COUNTY		SHEET NO.
1-97				
4-98				

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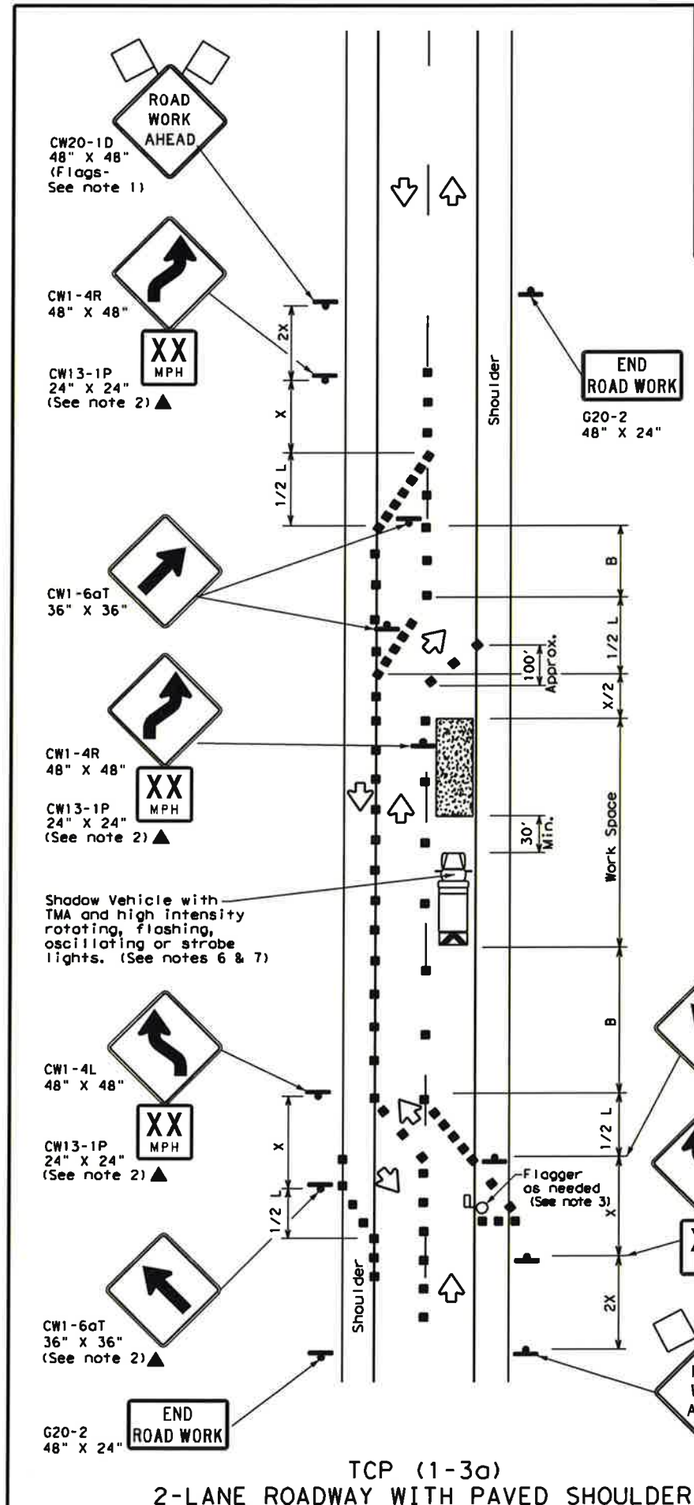


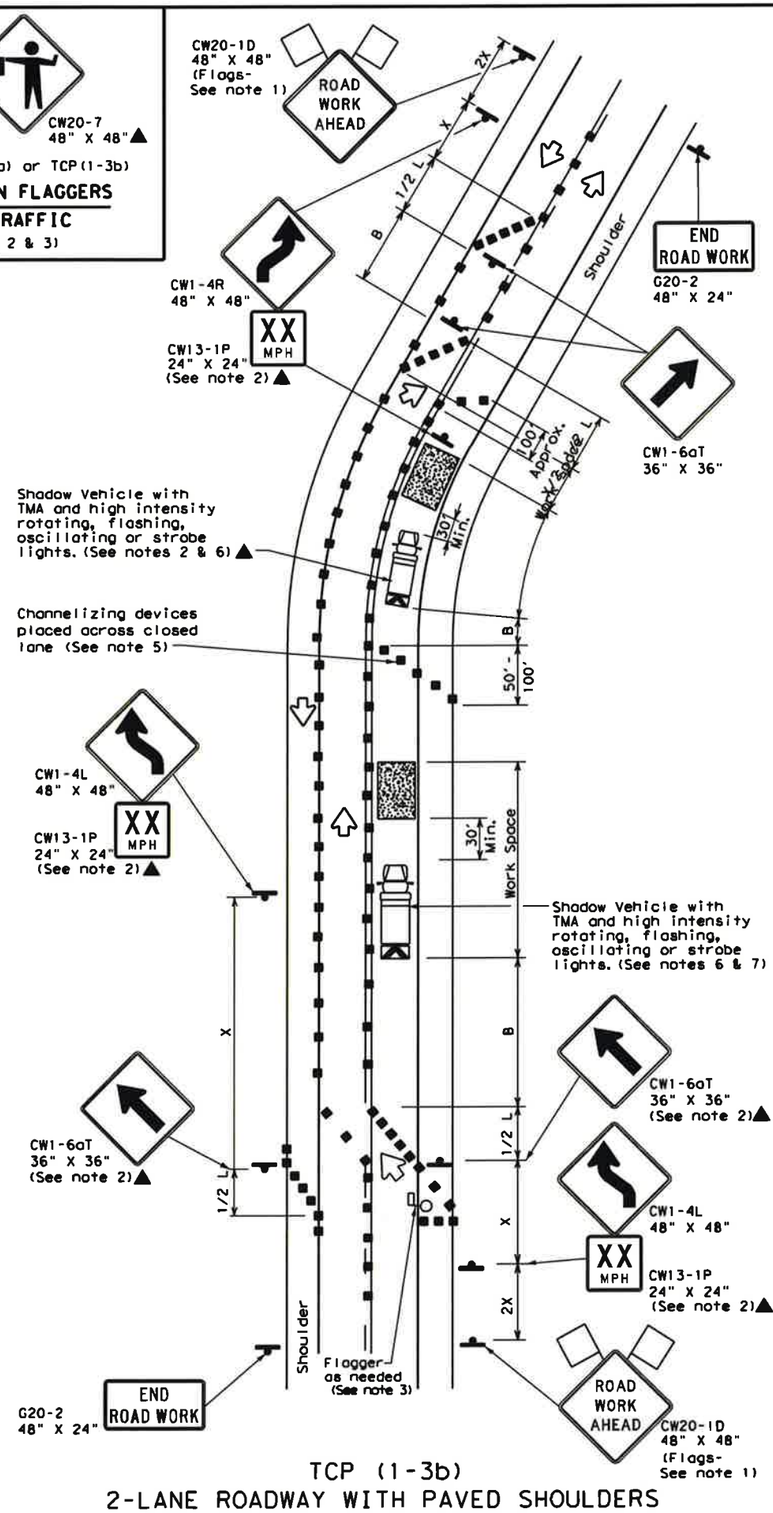
TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW

BE PREPARED TO STOP
CW3-4 48" X 48"▲
CW20-7 48" X 48"▲

For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC
(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade	■■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-12

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

REVISIONS
2-94 2-12
8-95
1-97
4-98

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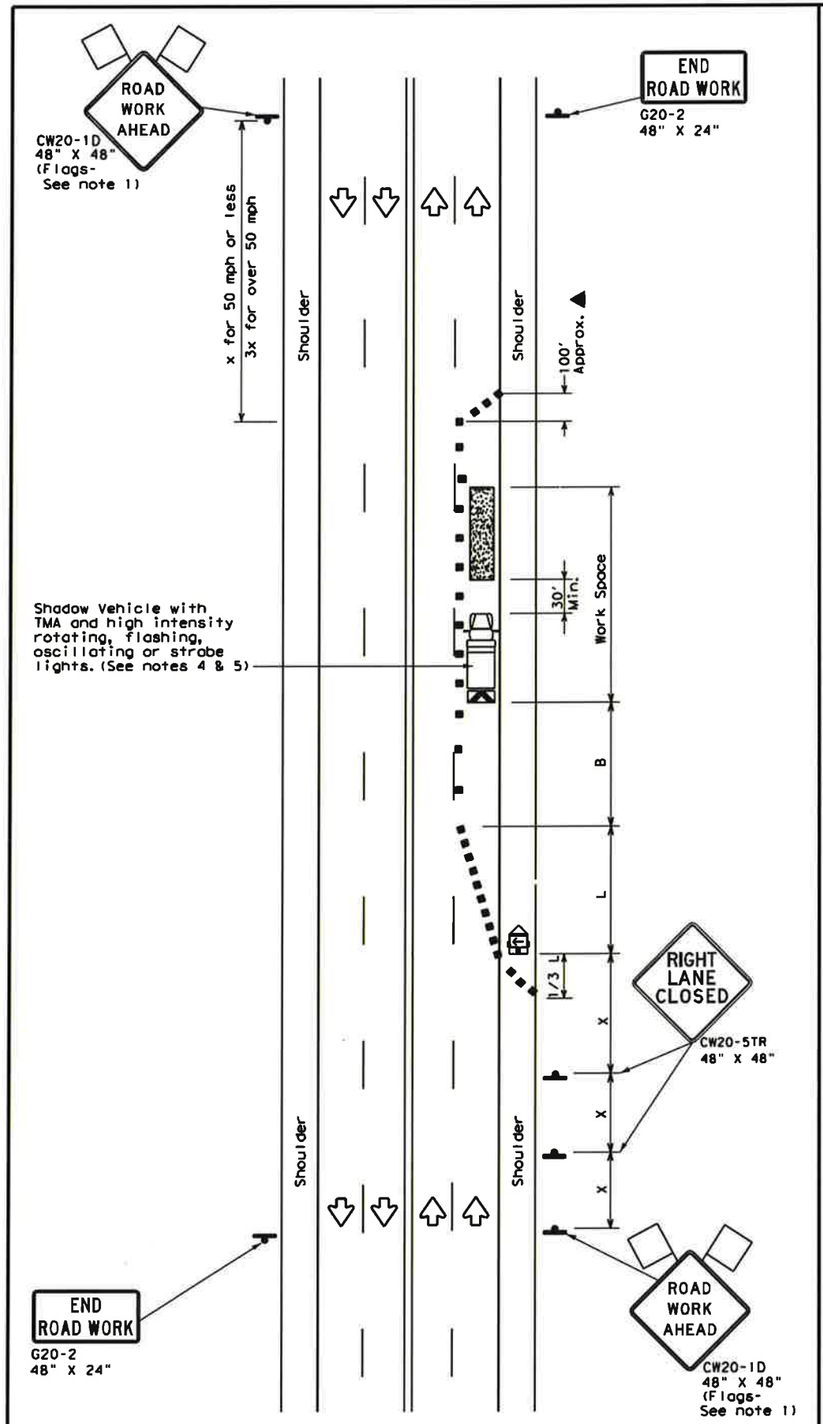
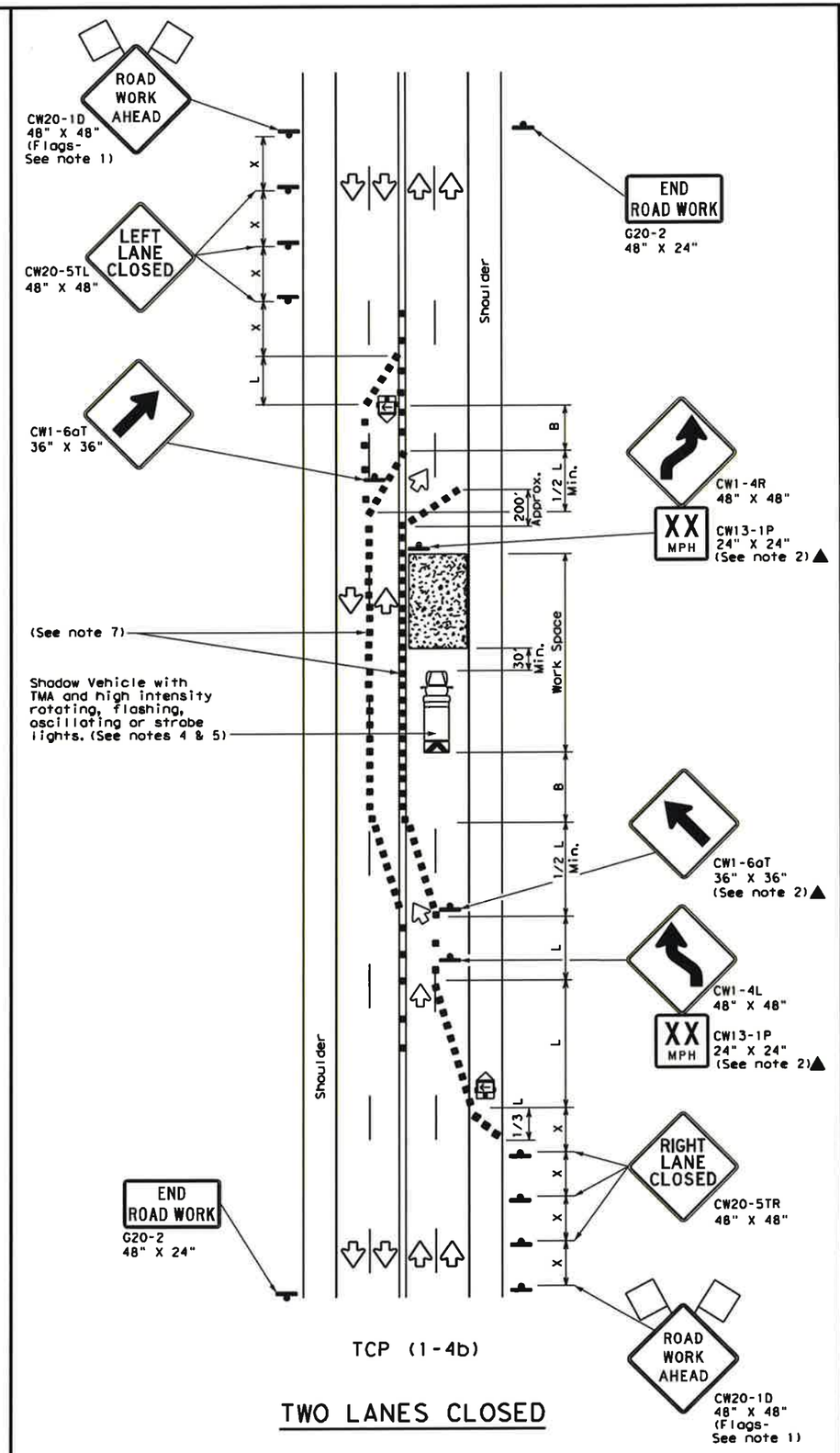


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-12

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

REVISIONS
2-94 2-12
8-95
1-97
4-98

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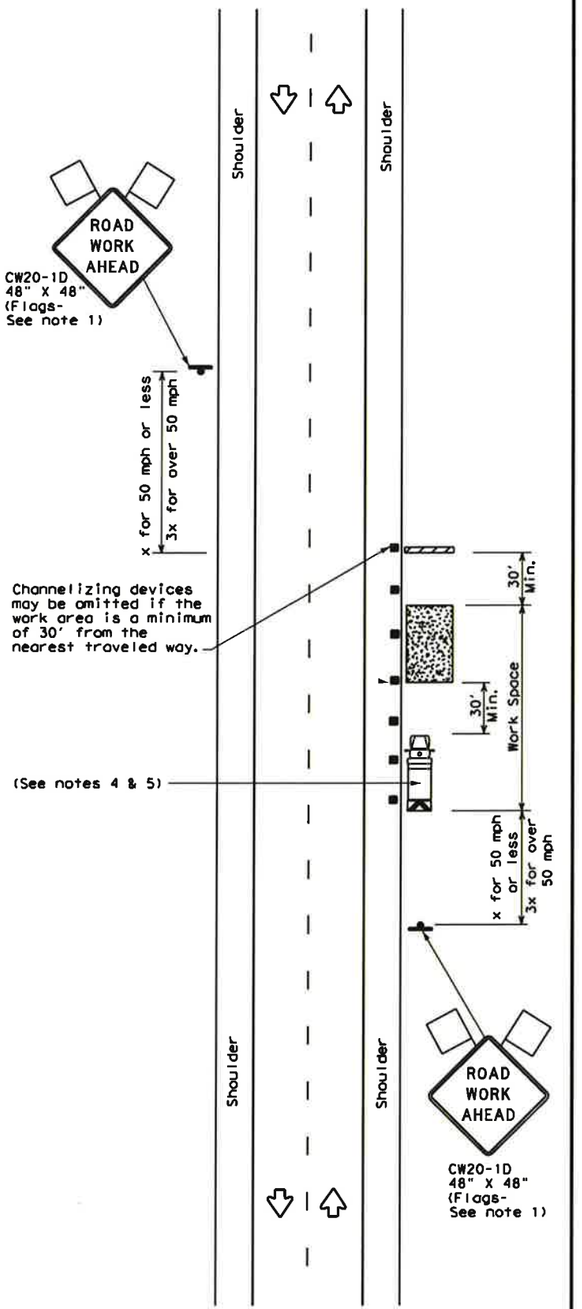
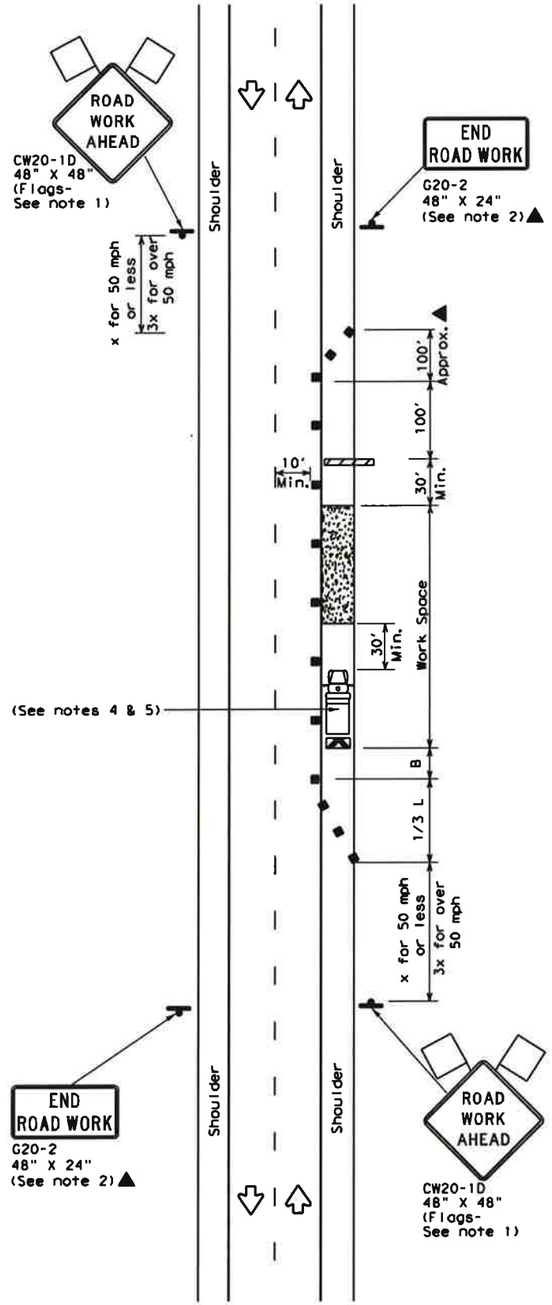


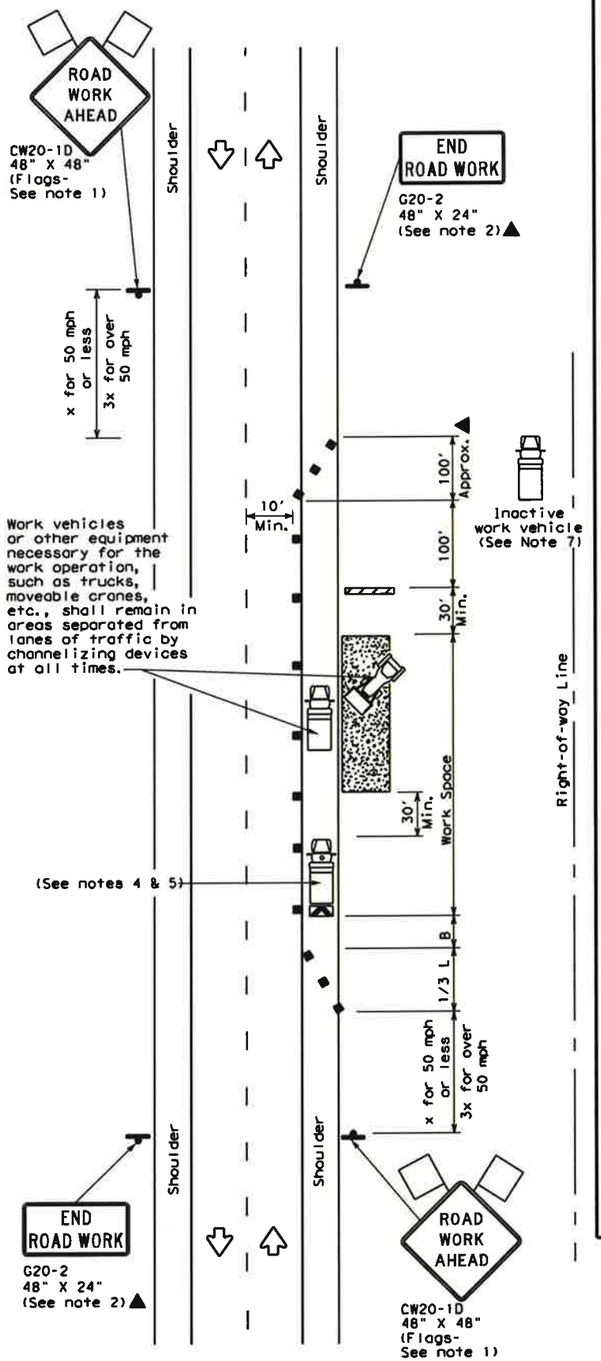
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-12

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2-94 2-12	CONT	SECT	JOB	HIGHWAY
8-95				
1-97	DIST	COUNTY		SHEET NO.
4-98				

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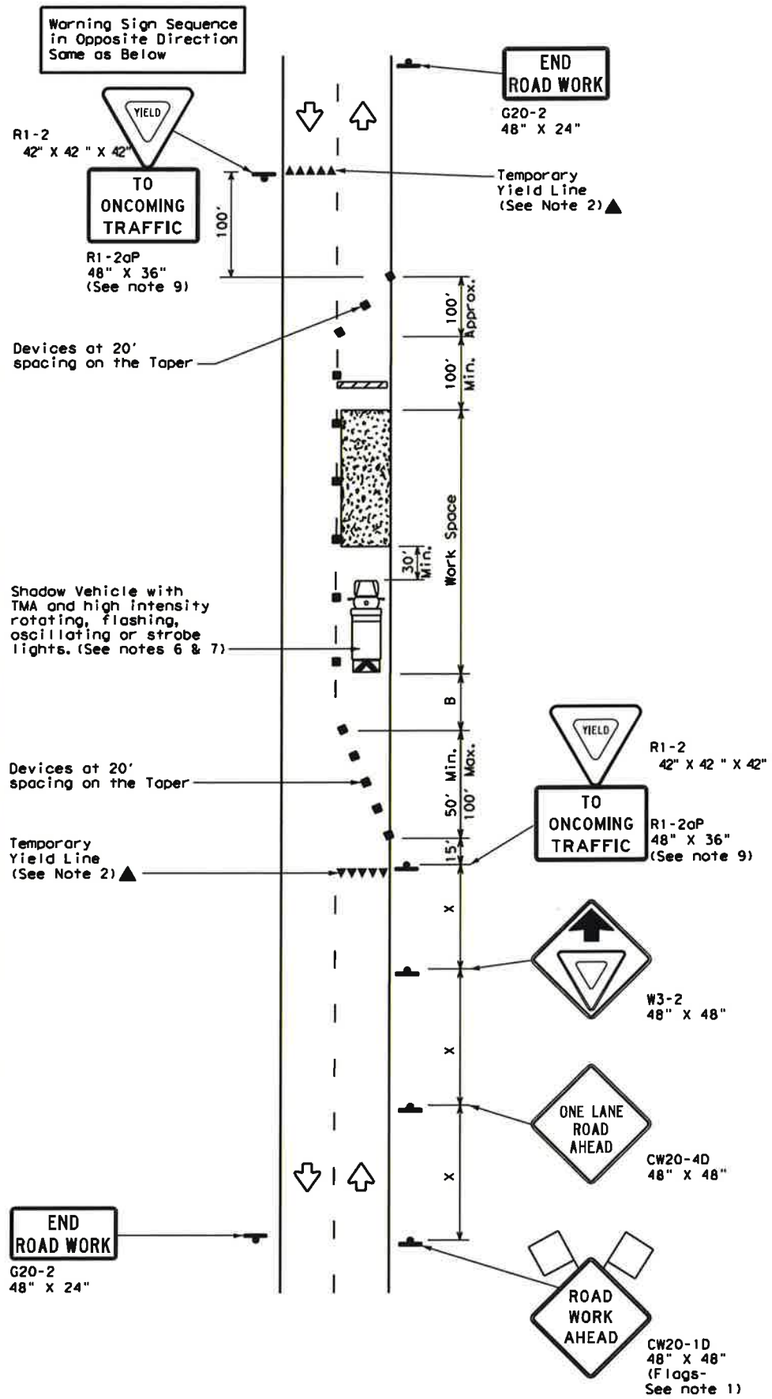
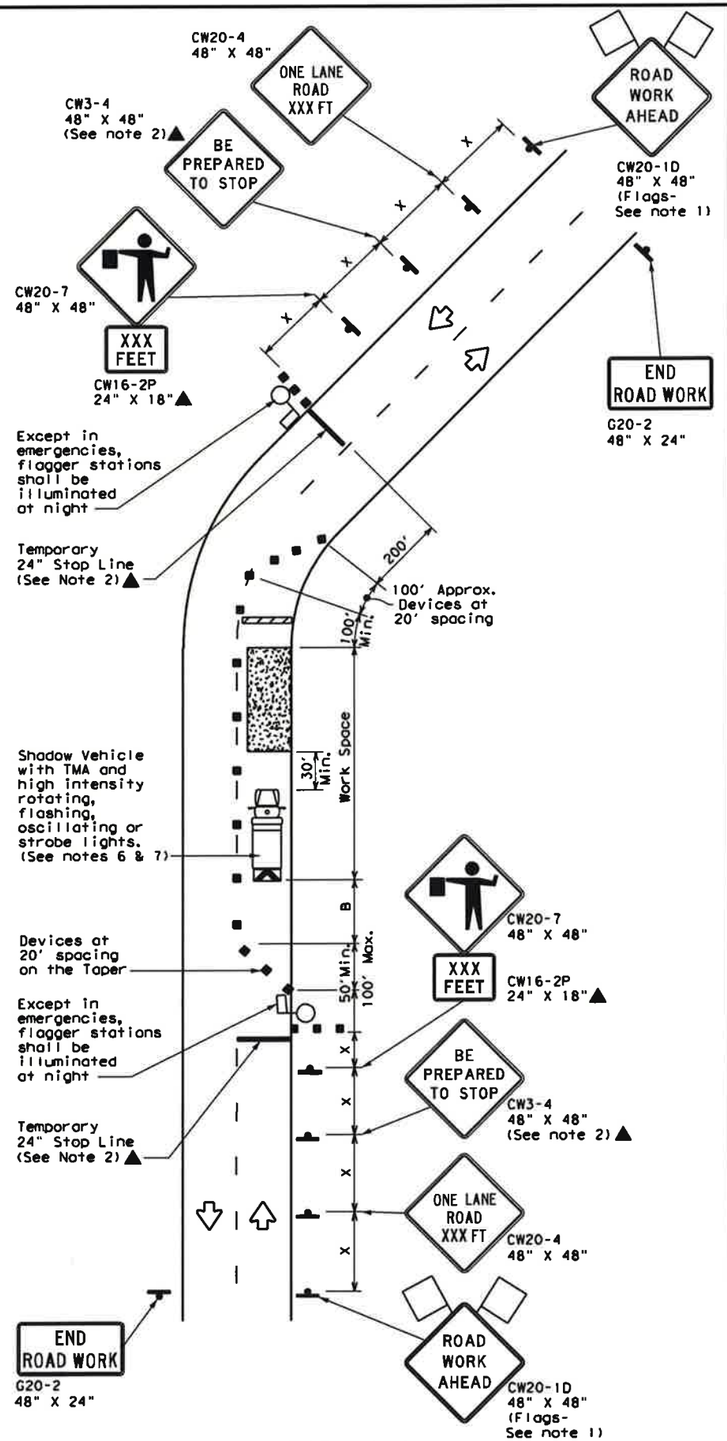


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-12

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
8-95 2-12				
1-97	DIST	COUNTY		SHEET NO.
4-98				
3-03				

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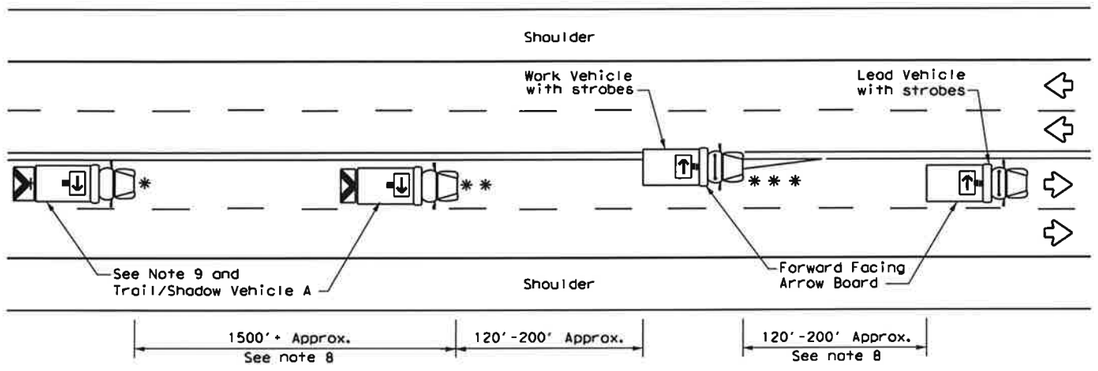
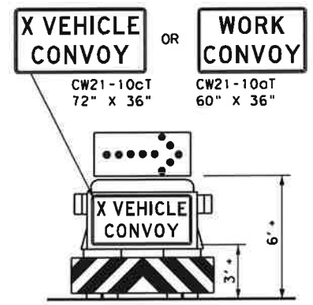


TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

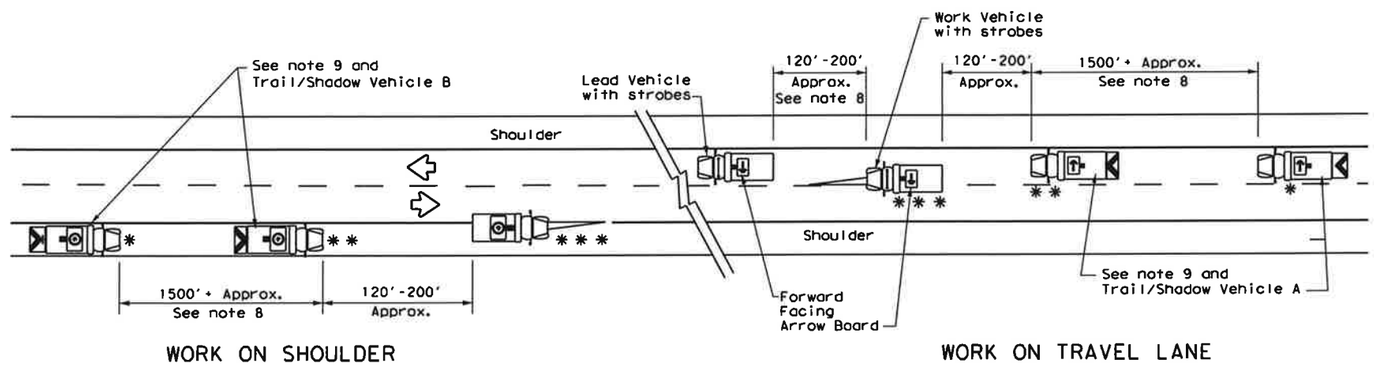
with RIGHT Directional display Flashing Arrow Board

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.

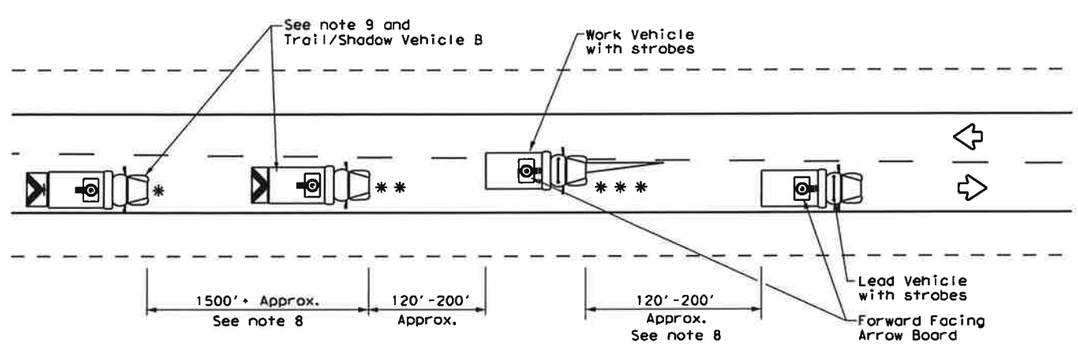


WORK ON SHOULDER

WORK ON TRAVEL LANE

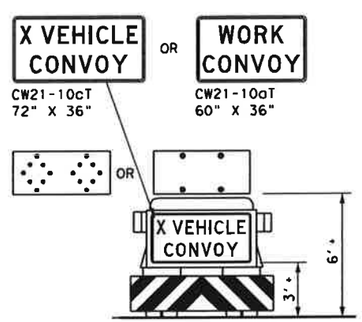
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



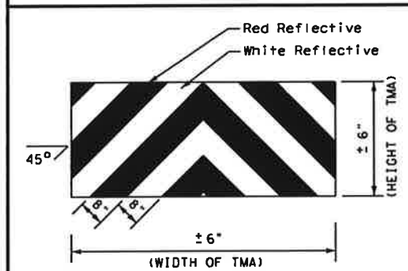
TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 2-94 4-98 8-95 7-13 1-97	DIST	COUNTY		SHEET NO.

175

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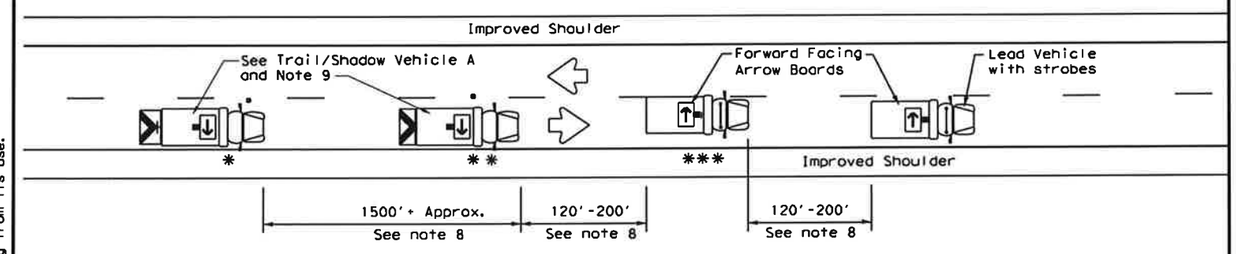
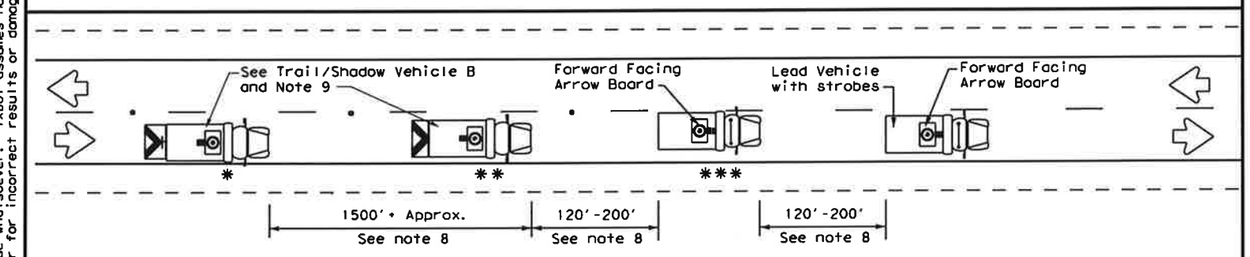


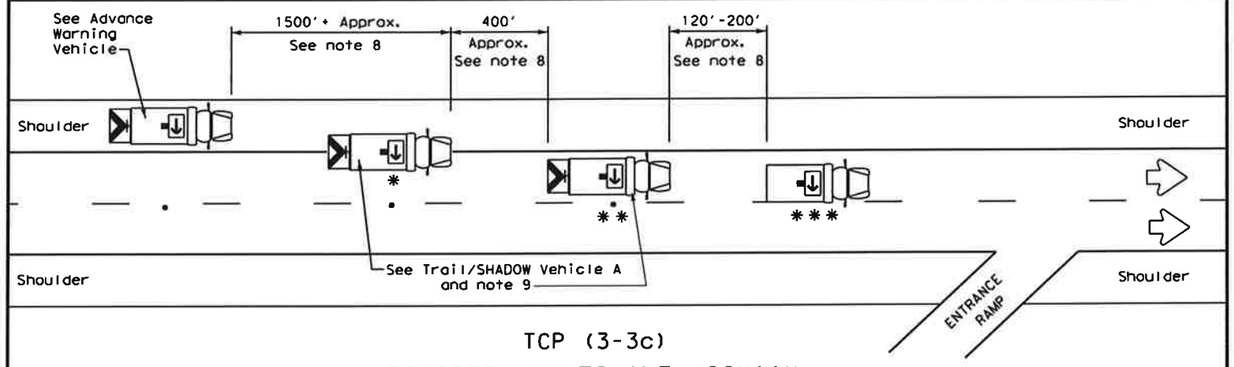
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS
(WORK ON TRAVEL LANE)



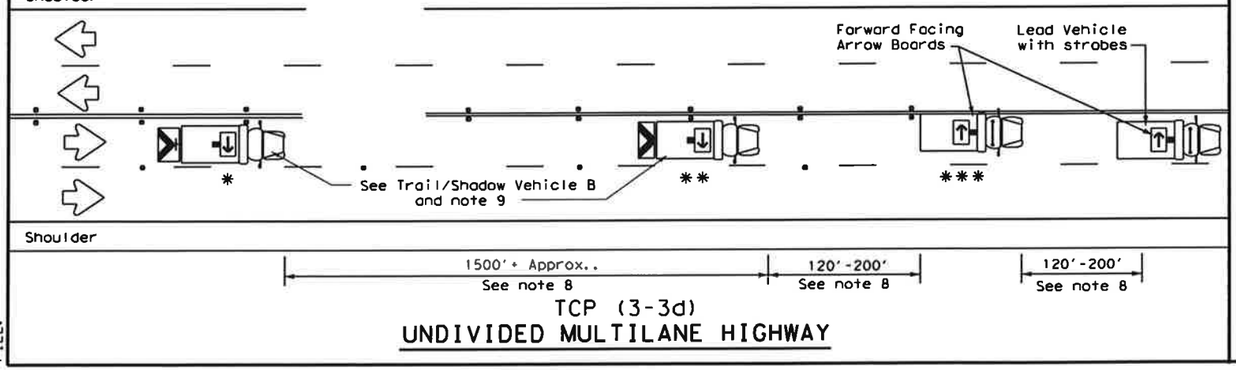
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS
(WORK ON TRAVEL LANE)



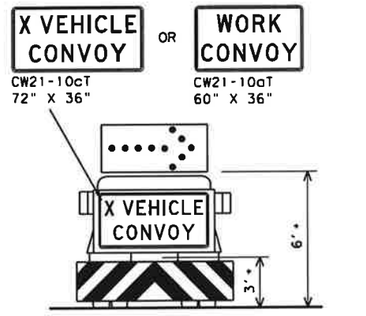
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



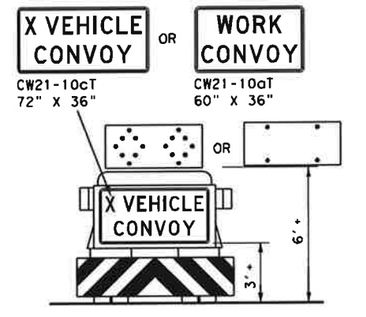
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



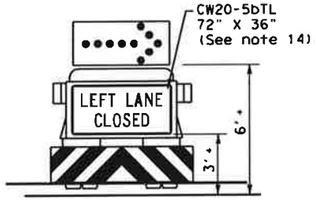
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

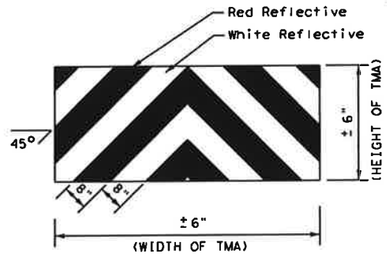


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
RAISED PAVEMENT
MARKER INSTALLATION
TCP(3-3)-13

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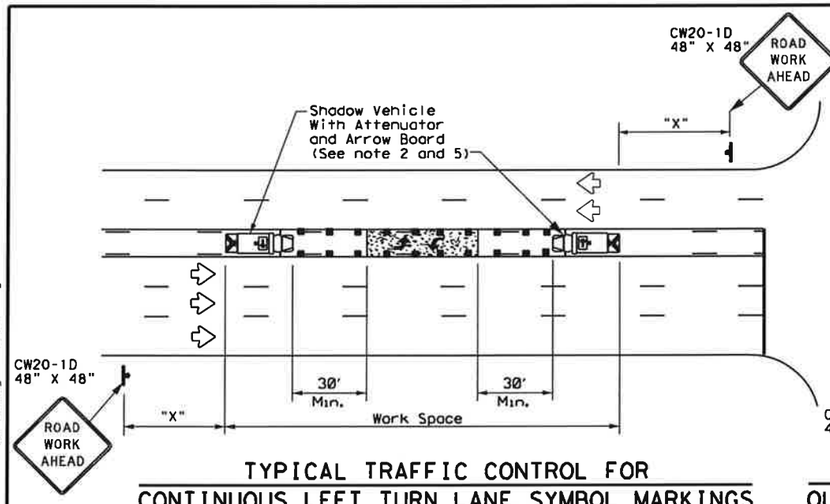
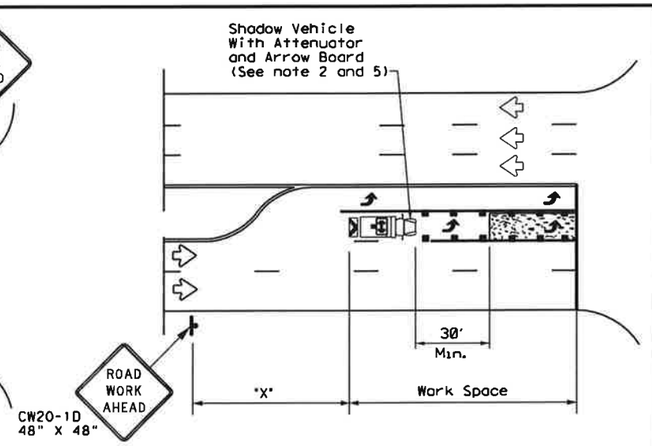
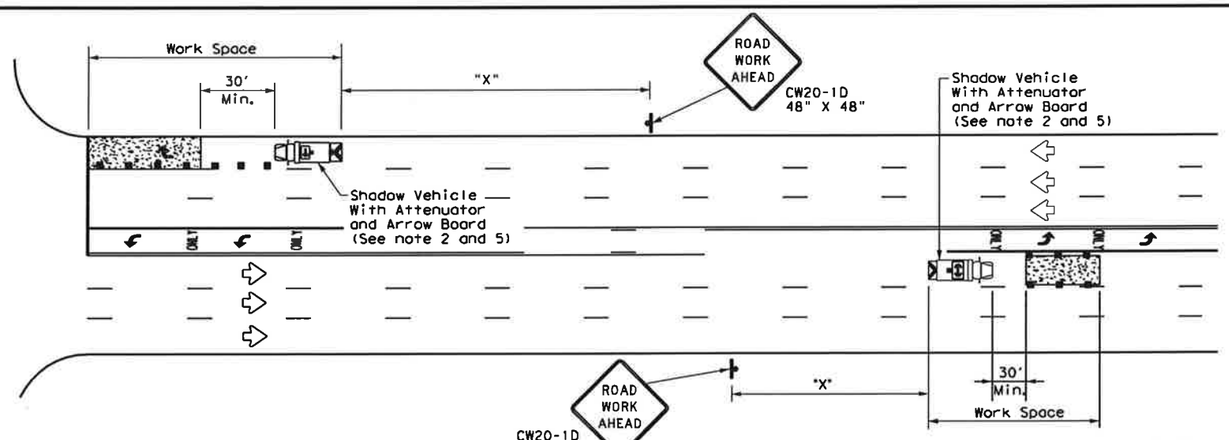


TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

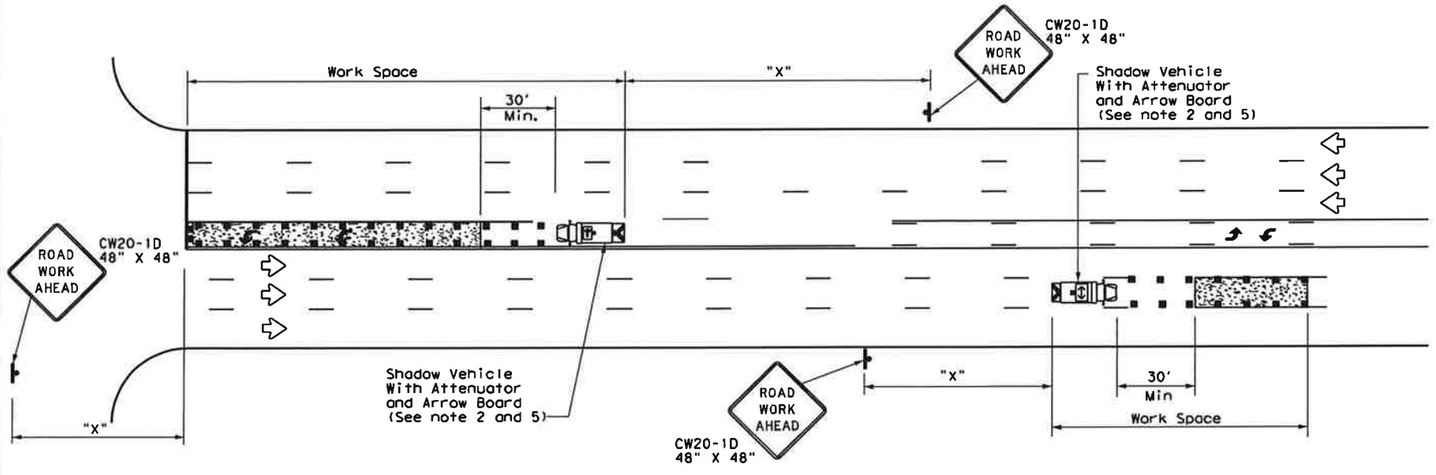


TYPICAL TRAFFIC CONTROL FOR
OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR
LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
CENTER LANE MARKINGS

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		Channelizing Devices

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

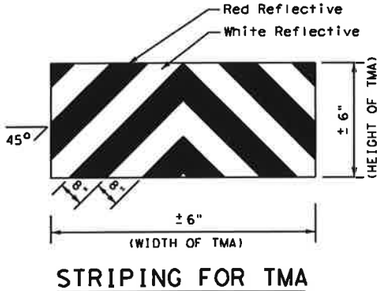
* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

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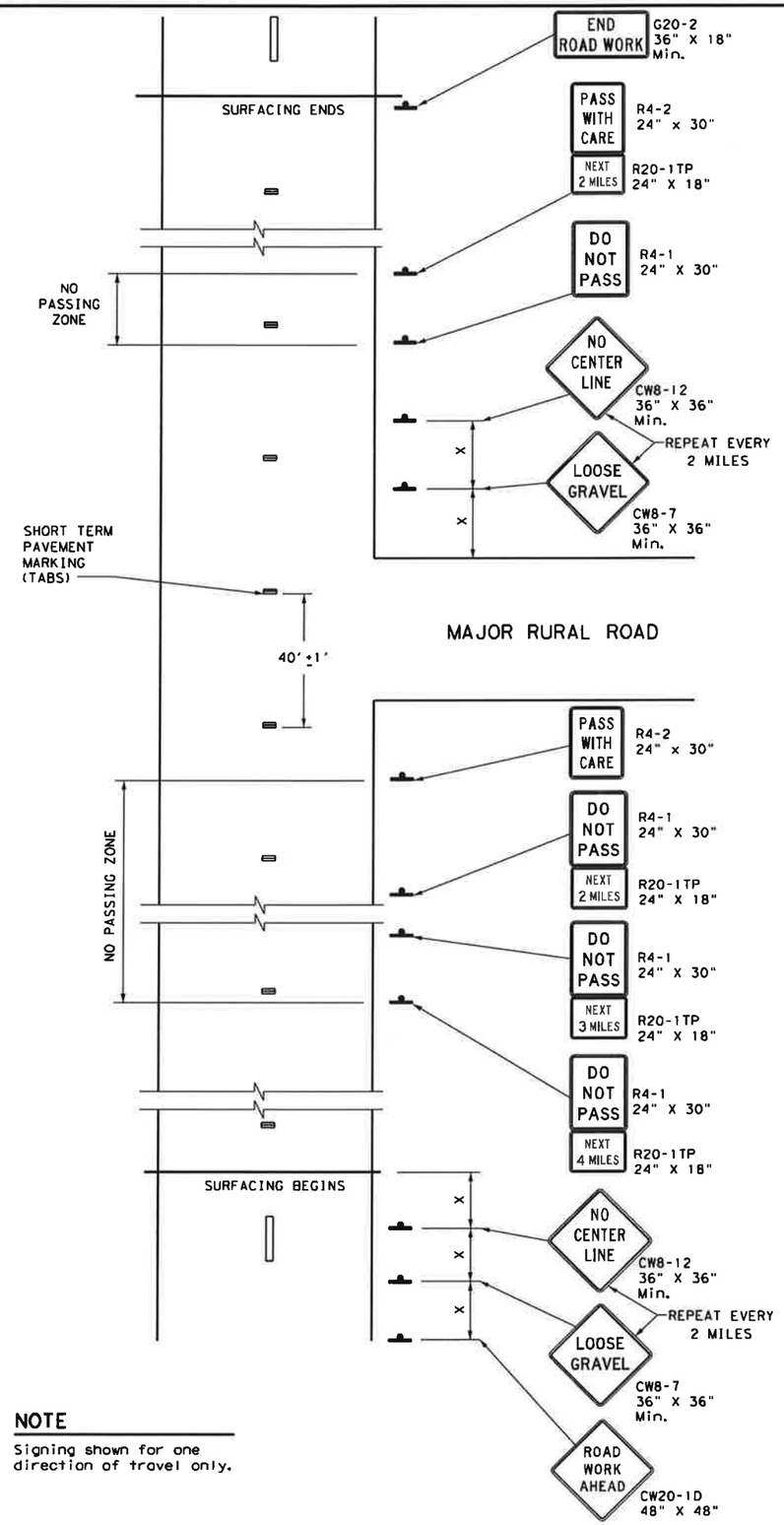
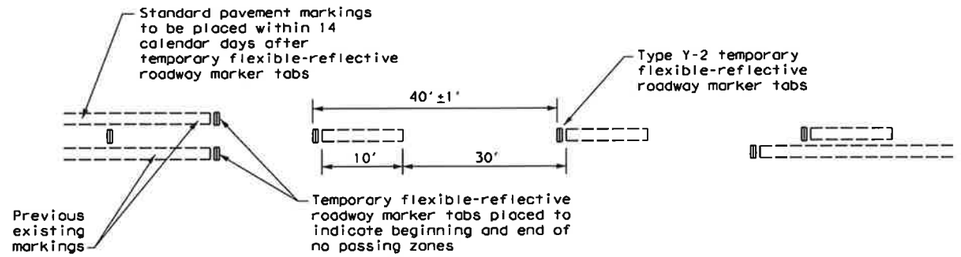


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets", the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel" labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes prequalified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-13

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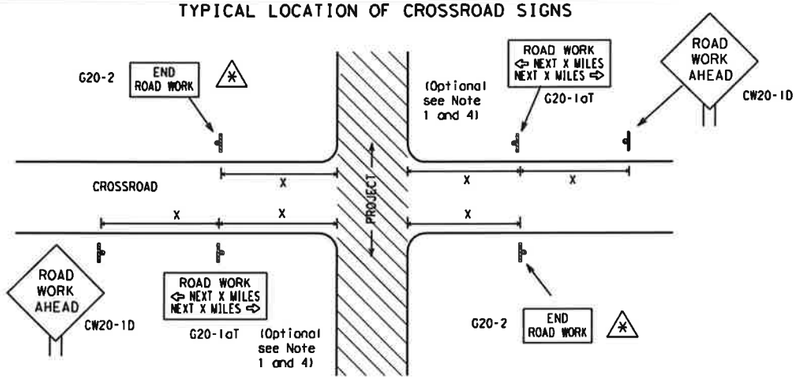
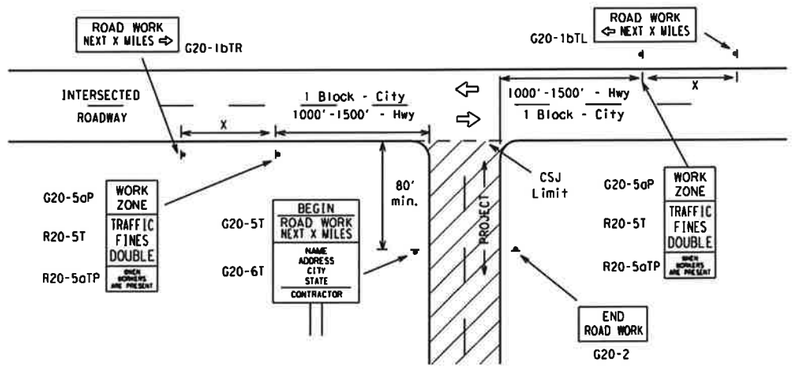
TYPICAL LOCATION OF CROSSROAD SIGNS



⚠* May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING [1,5,6]

Sign Number or Series	SIZE: Conventional Road	SIZE: Expressway/ Freeway
CW20[4], CW21, CW22, CW23, CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING: Posted Speed	Sign Δ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500 *
60	600 *
65	700 *
70	800 *
75	900 *
80	1000 *
*	* [3]

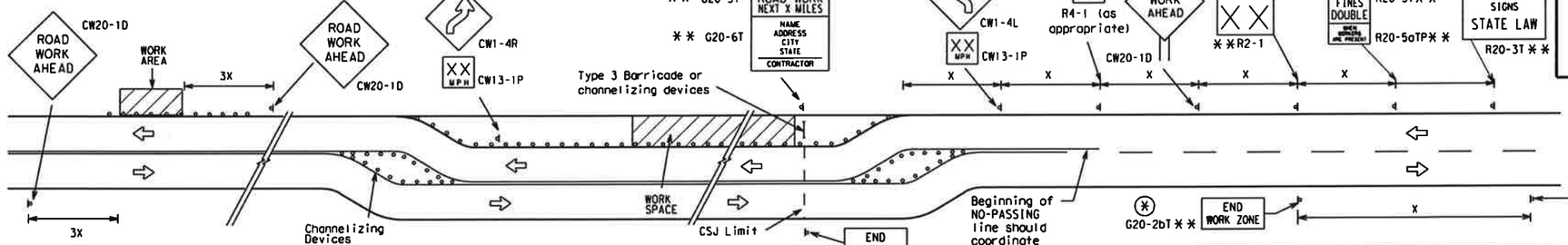
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

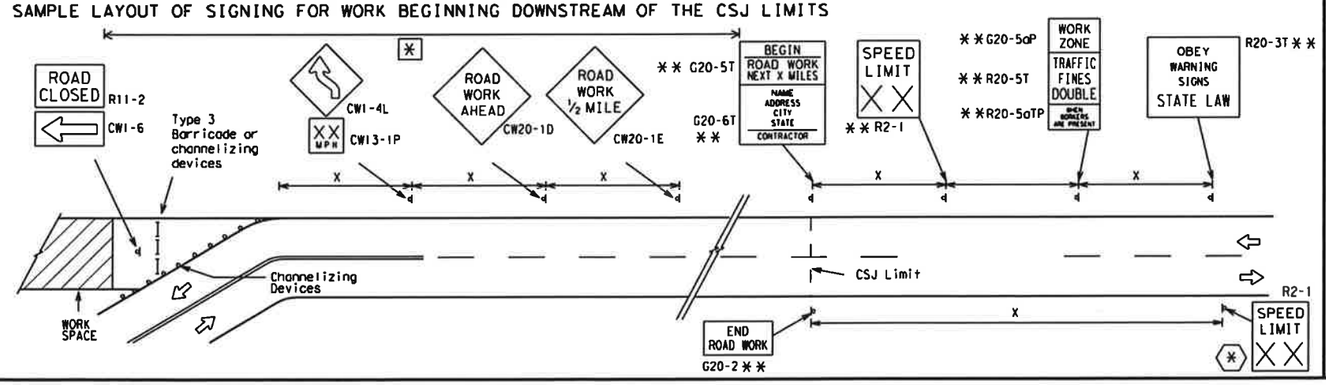
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

⊛ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

⊠ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

⊛ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

⊢⊣	Type 3 Barricade
○○○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-13

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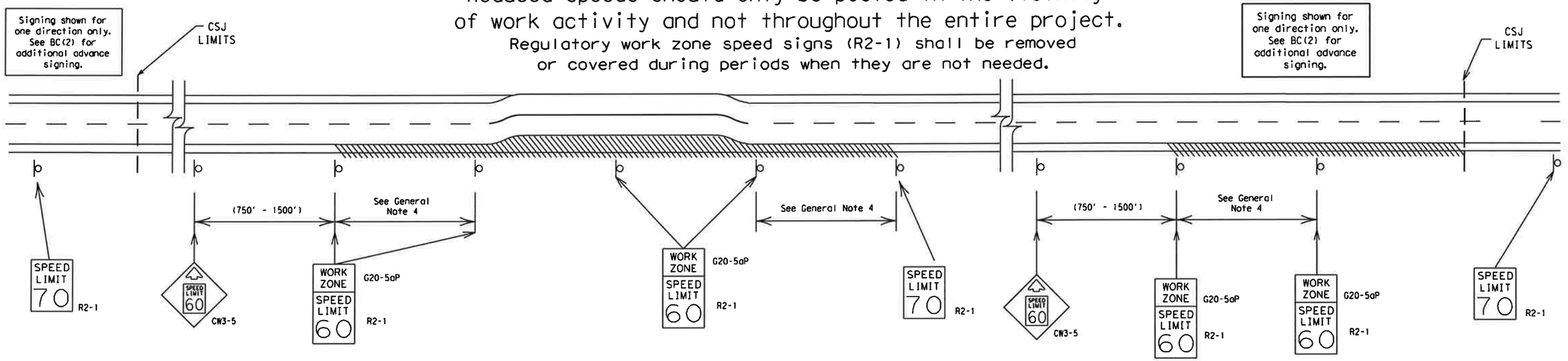
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the travelled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, errection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-13

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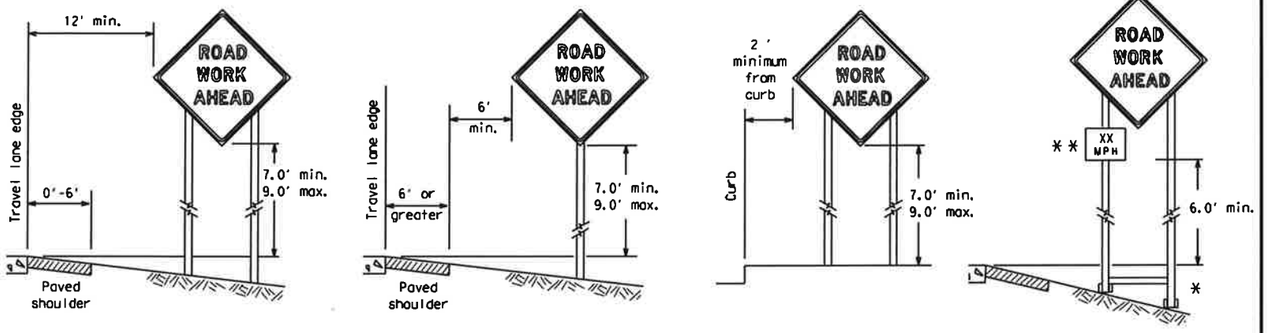
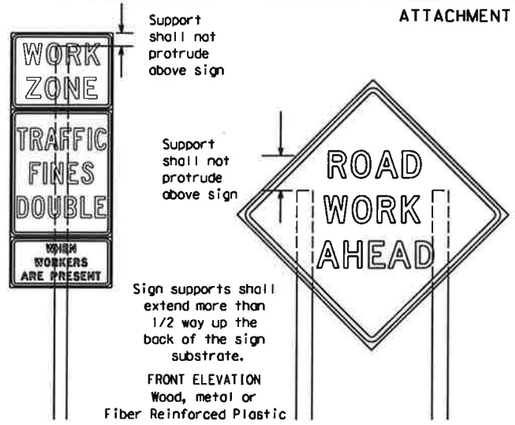
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



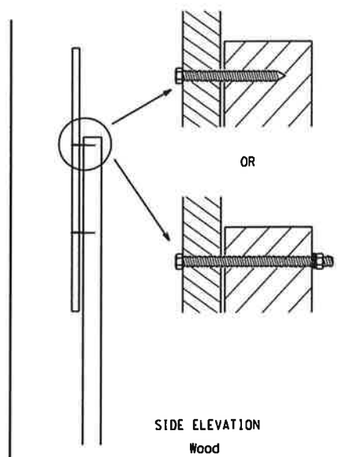
* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same guage material.

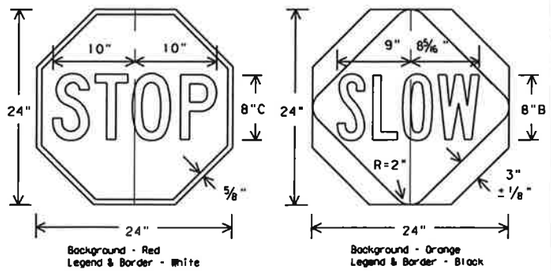


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-13

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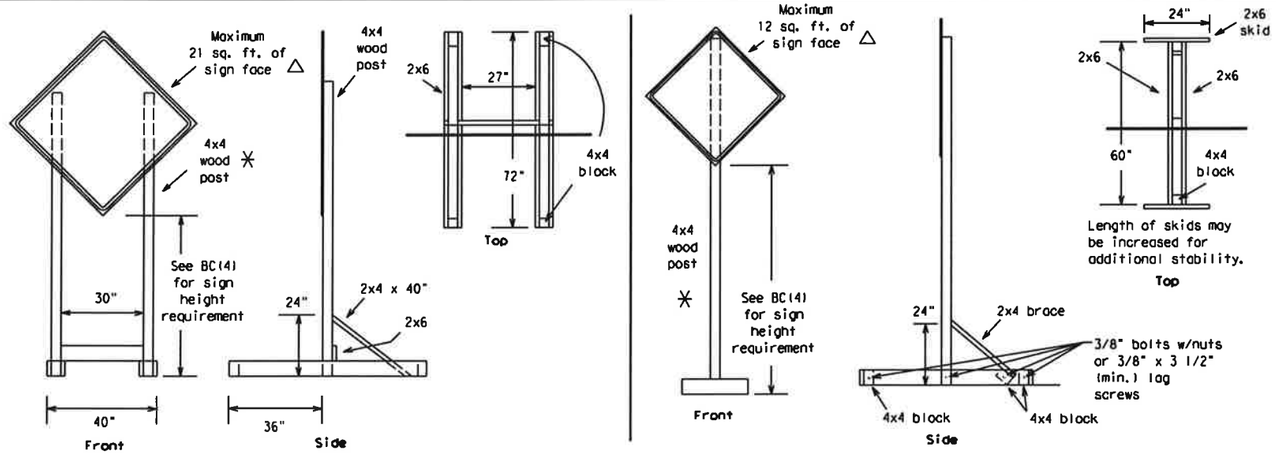
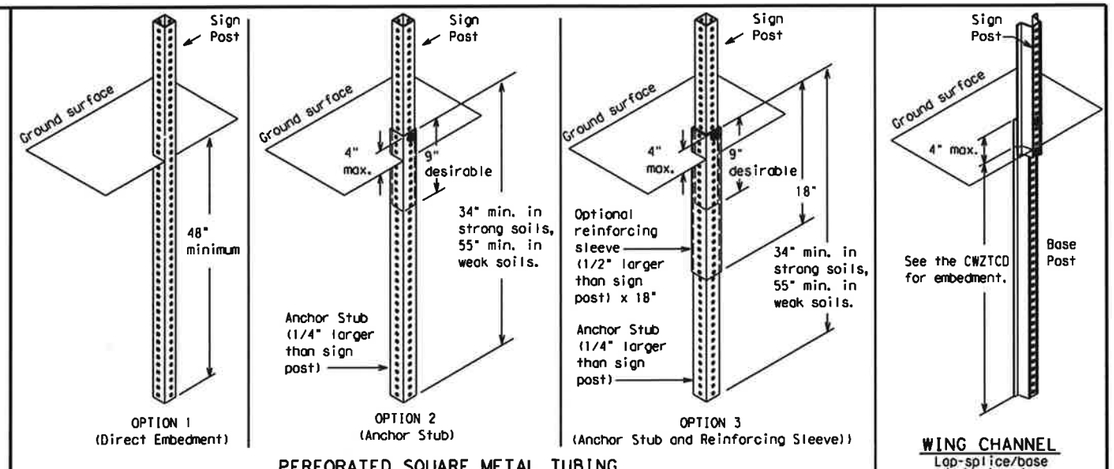


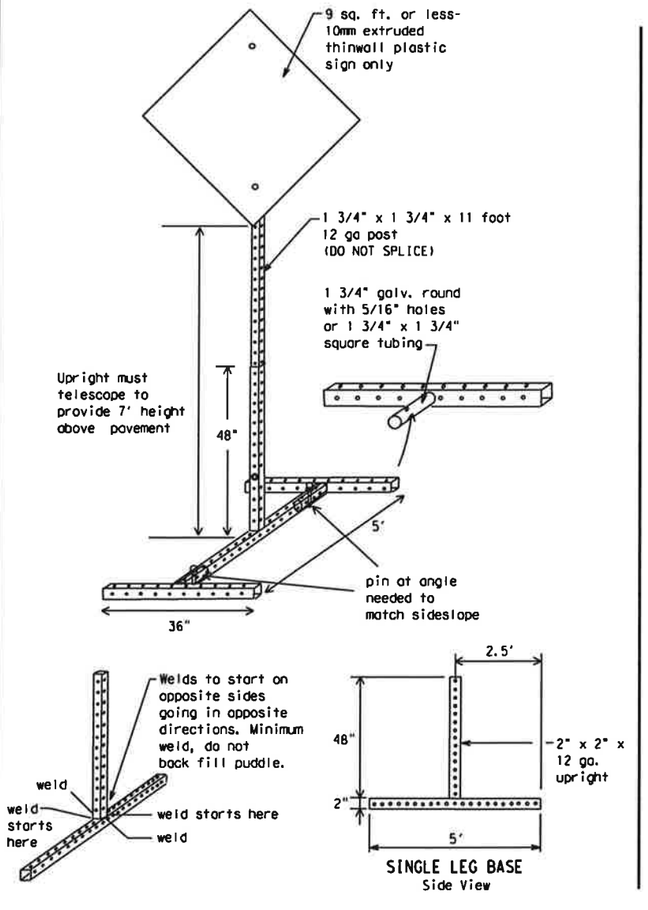
SKID MOUNTED WOOD SIGN SUPPORTS

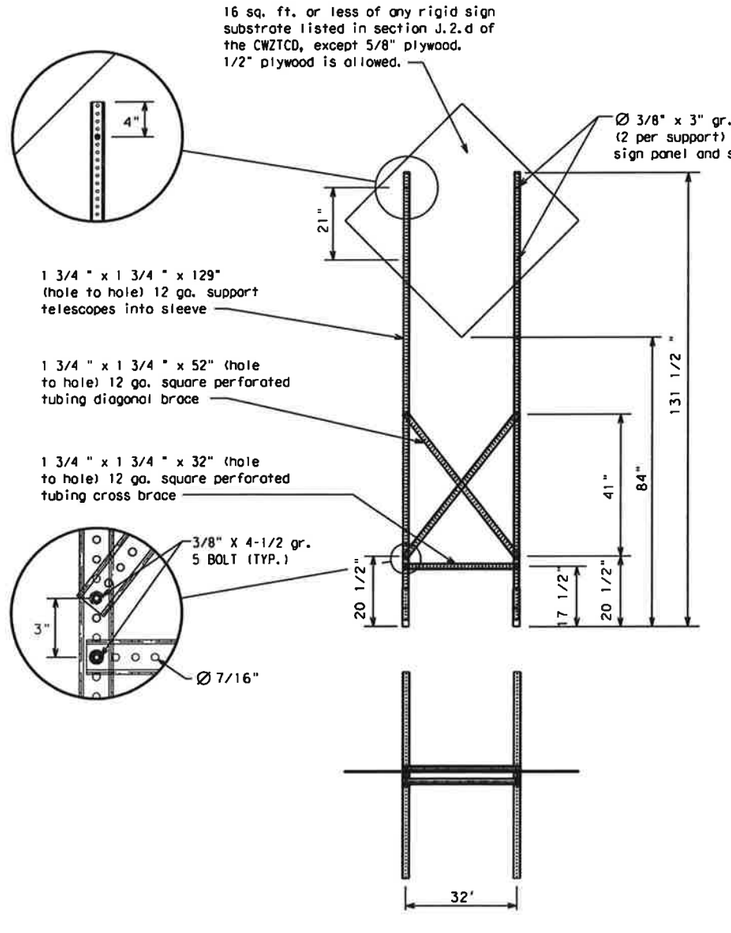
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

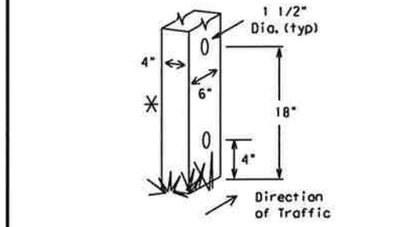


GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.

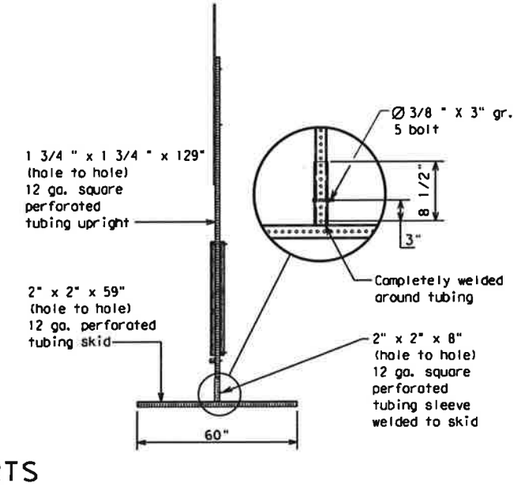






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."

✳ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-13

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation = IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

- FREEWAY CLOSED X MILE
- FRONTAGE ROAD CLOSED
- ROAD CLOSED AT SH XXX
- SHOULDER CLOSED XXX FT
- ROAD CLSD AT FM XXXX
- RIGHT LN CLOSED XXX FT
- RIGHT X LANES CLOSED
- RIGHT X LANES OPEN
- CENTER LANE CLOSED
- DAYTIME LANE CLOSURES
- NIGHT LANE CLOSURES
- I-XX SOUTH EXIT CLOSED
- VARIOUS LANES CLOSED
- EXIT XXX CLOSED X MILE
- EXIT CLOSED
- RIGHT LN TO BE CLOSED
- MALL DRIVEWAY CLOSED
- X LANES CLOSED TUE - FRI
- XXXXXXXX BLVD CLOSED

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

- MERGE RIGHT
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE *

Location List

- AT FM XXXX
- BEFORE RAILROAD CROSSING
- NEXT X MILES
- PAST US XXX EXIT
- XXXXXXX TO XXXXXXX
- US XXX TO FM XXXX

Warning List

- SPEED LIMIT XX MPH
- MAXIMUM SPEED XX MPH
- MINIMUM SPEED XX MPH
- ADVISORY SPEED XX MPH
- RIGHT LANE EXIT
- USE CAUTION
- DRIVE SAFELY
- DRIVE WITH CARE

** Advance Notice List

- TUE-FRI XX AM- X PM
- APR XX-XX X PM-X AM
- BEGINS MONDAY
- BEGINS MAY XX
- MAY X-X XX PM - XX AM
- NEXT FRI-SUN
- XX AM TO XX PM
- NEXT TUE AUG XX
- TONIGHT XX PM- XX AM

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-13

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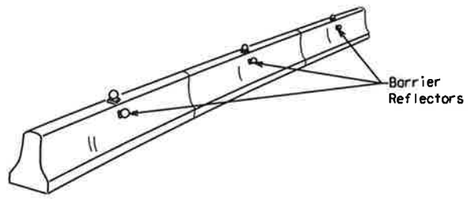
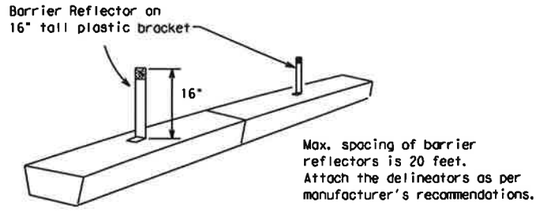
1. Barrier Reflectors shall be prequalified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

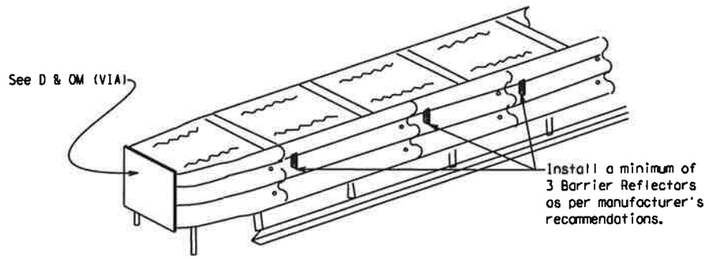


CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB)

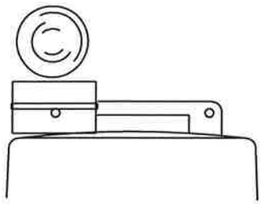


DELINEATION OF END TREATMENTS

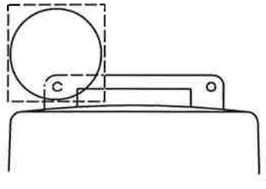
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

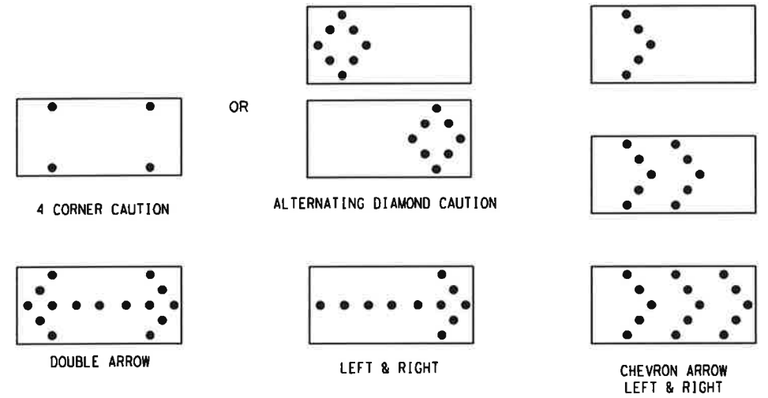
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-13

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Prequalified plastic drums shall meet the following requirements:

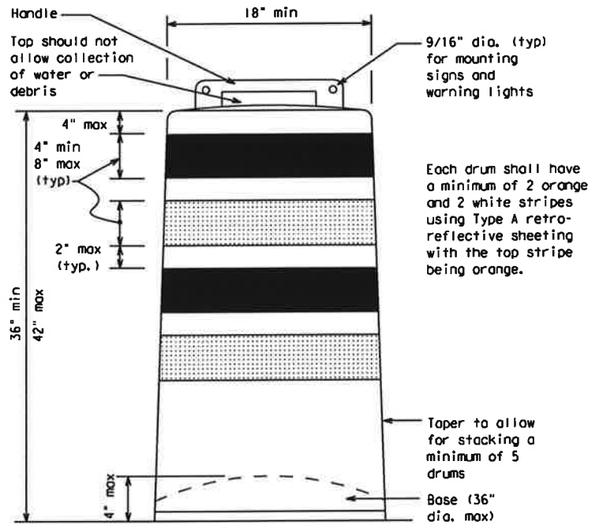
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

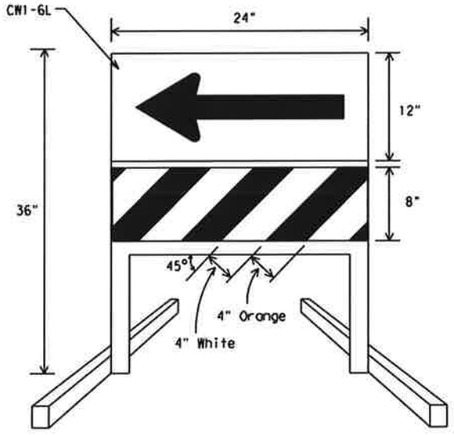
RETROREFLECTIVE SHEETING

1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would became hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

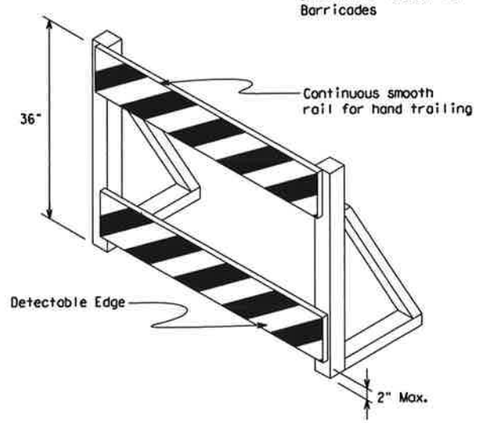




DIRECTION INDICATOR BARRICADE

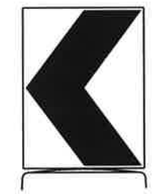
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades



DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer

12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-13

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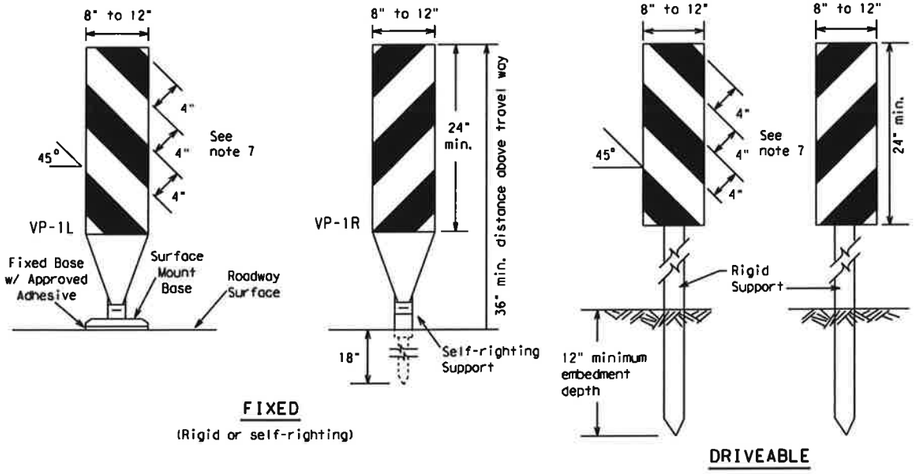
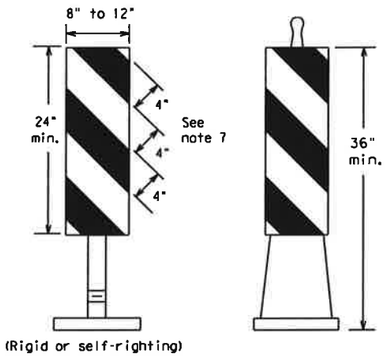


FIXED
(Rigid or self-righting)

DRIVEABLE

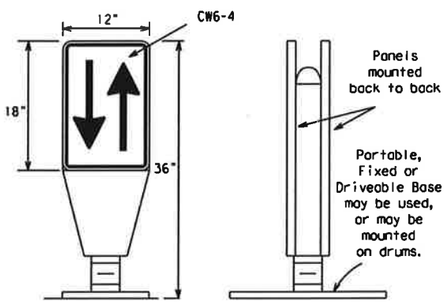


(Rigid or self-righting)

PORTABLE

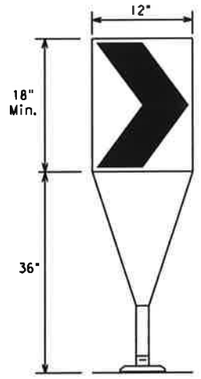
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



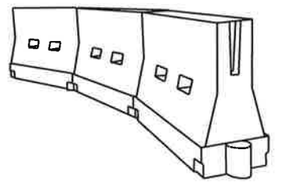
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L=WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-13

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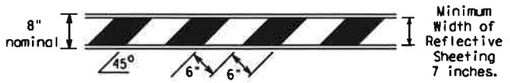
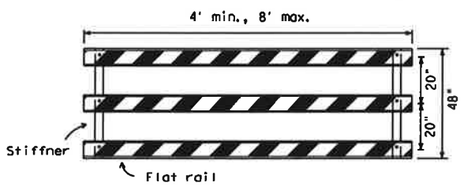
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Baricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specfication DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



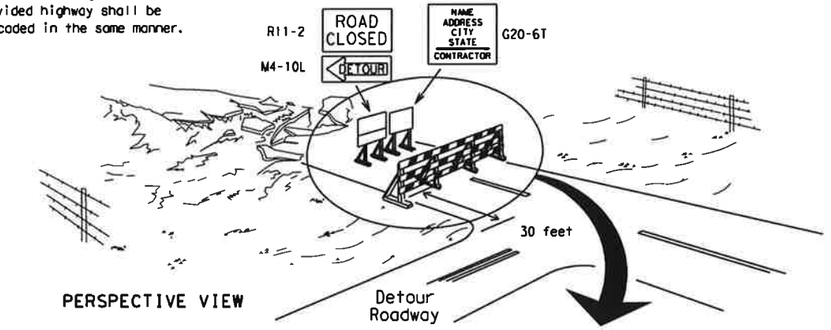
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffner may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

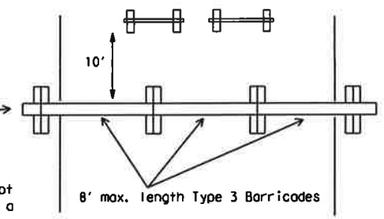
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

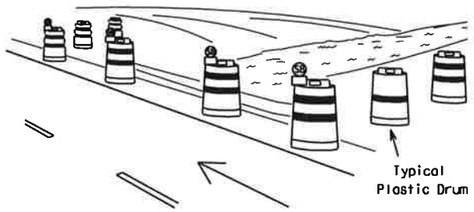
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

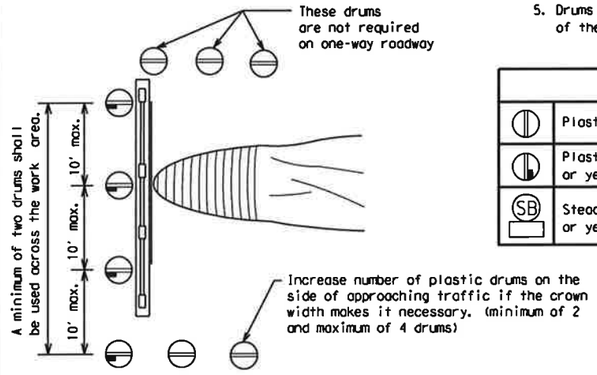
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

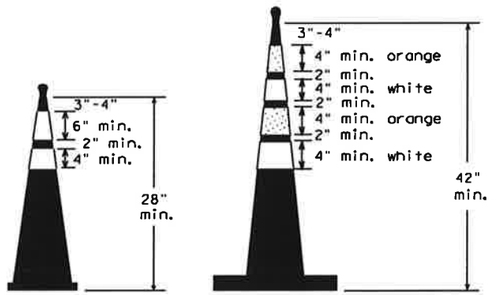
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

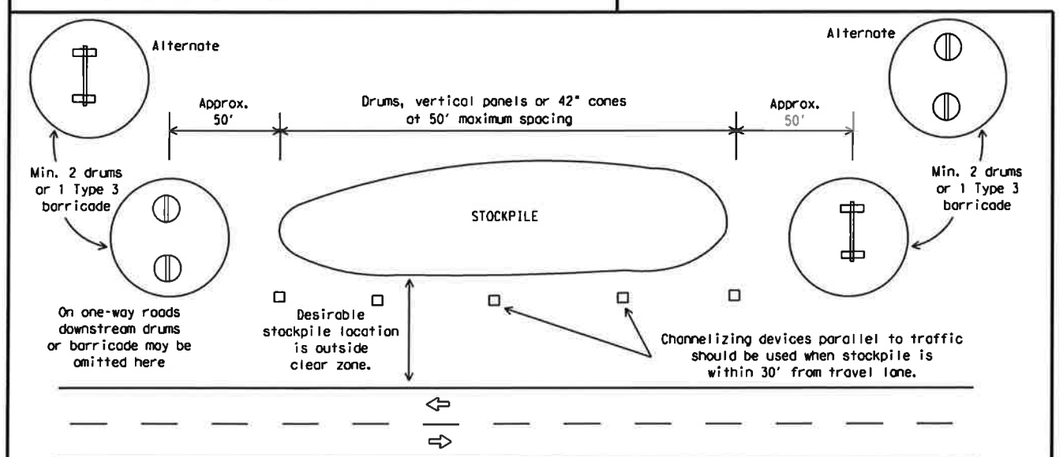
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.

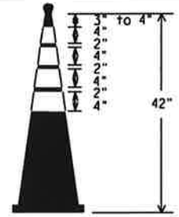
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-13

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

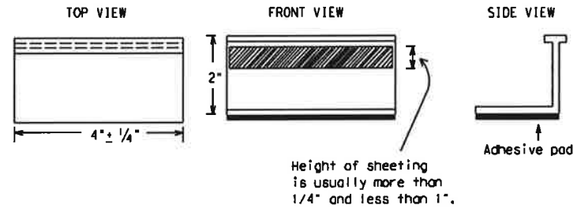
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-13

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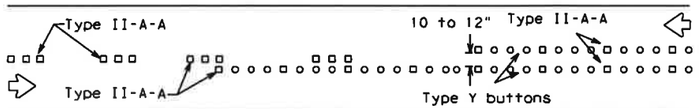
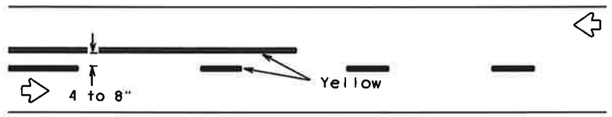
PAVEMENT MARKING PATTERNS

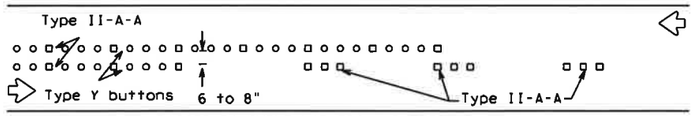
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



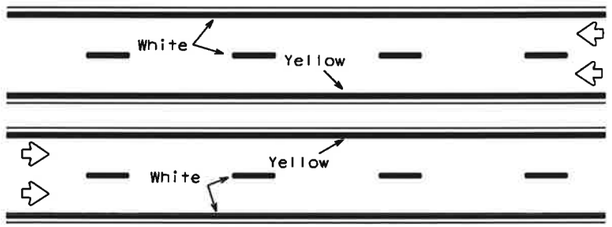
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



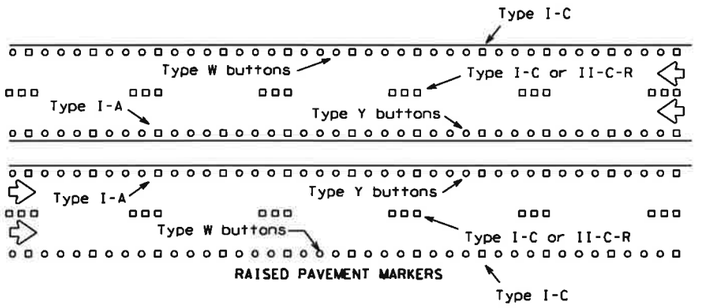
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



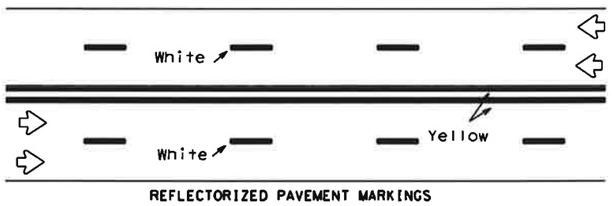
REFLECTORIZED PAVEMENT MARKINGS



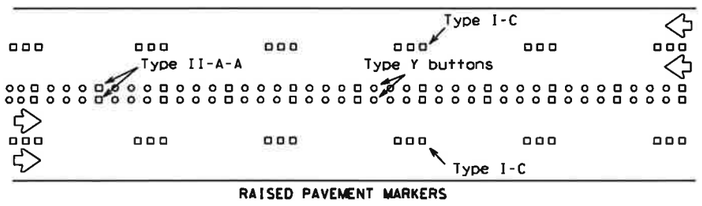
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



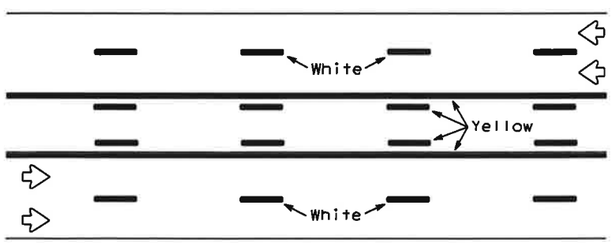
REFLECTORIZED PAVEMENT MARKINGS



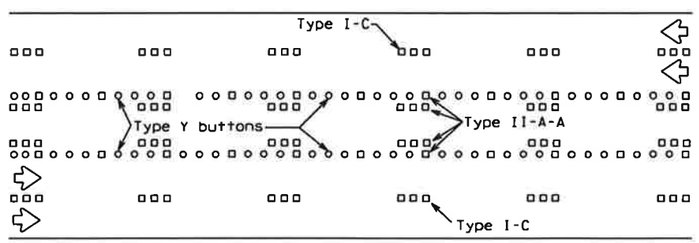
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

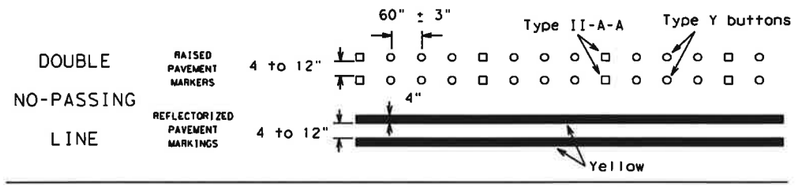
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

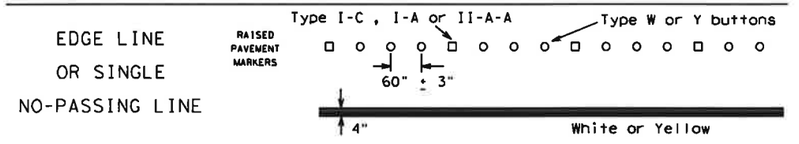
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

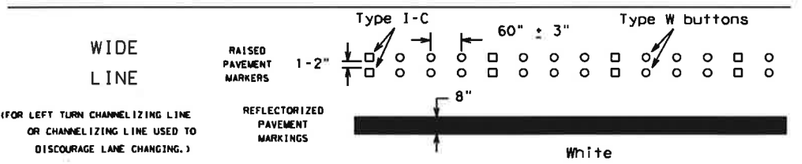


EDGE LINE OR SINGLE NO-PASSING LINE



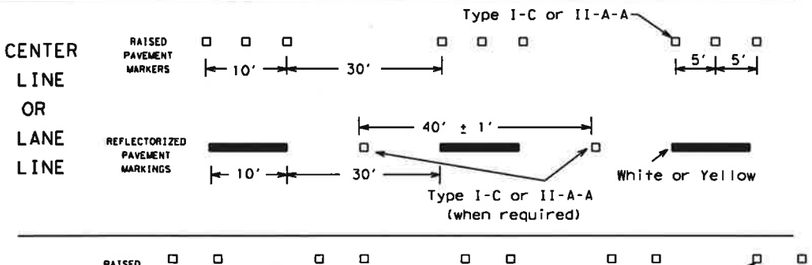
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

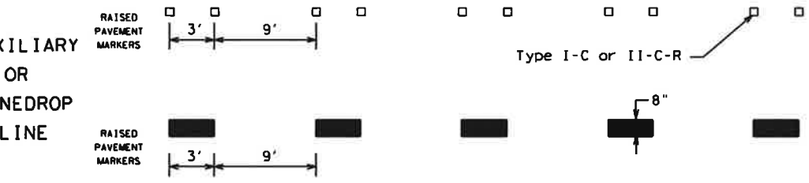


BROKEN LINES

CENTER LINE OR LANE LINE

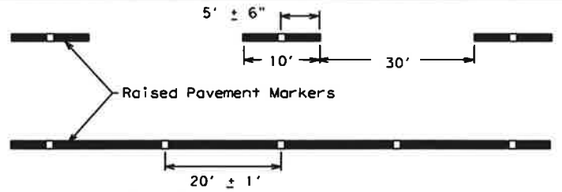


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-13

FILE: bc-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
1-97 11-02 7-13	DIST	COUNTY		SHEET NO.
2-98 9-07				

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